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xmu+

Installation & Maintenance Guide

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XMU+ Installation and Maintenance Guide
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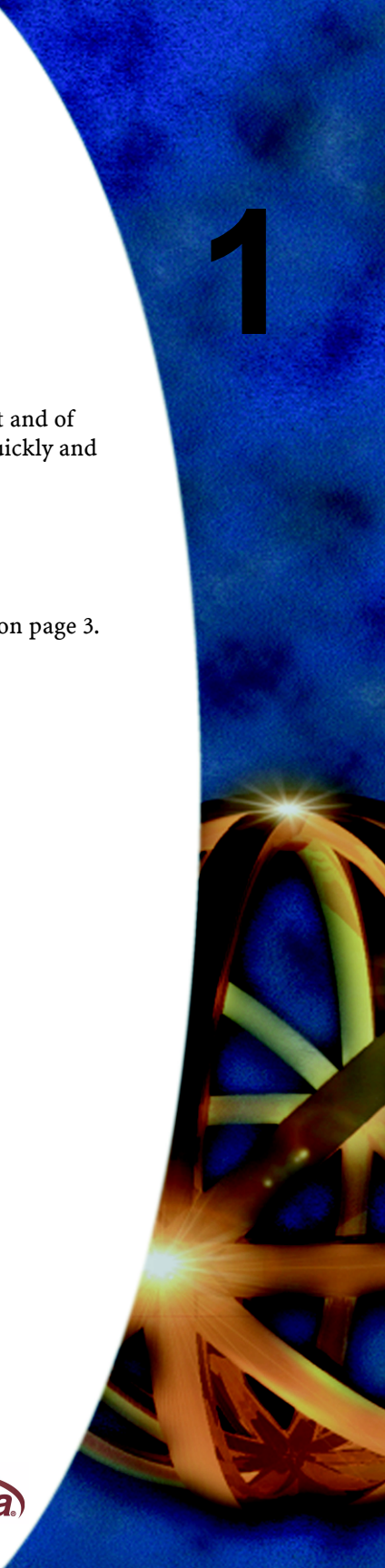
1 Introducing XMU+

Read this chapter to gain an understanding of the XMU+ product and of how this installation guide can help you install the XMU+ unit quickly and safely.

In this chapter....

- *About the XMU+ Announcement and Call Processing System* on page 3.
- *About XMUCOM+ Software* on page 3.
- *Product Overview* on page 4.
- *In this book* on page 9.



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About the XMU+ Announcement and Call Processing System

The XMU+ Digital Call Processor is a voice announcement and call processing system.

Modular in design and field upgradable, the XMU+ offers major advantages in processing customer calls for a broad range of customer needs. The XMU+ delivers:

- High quality ACD/UCD announcements.
- Interactive auto-attendant functionality.
- Pre-recorded messages that play to assigned lines when the unit is activated by an incoming call.
- Ability for users to navigate through different levels of messages by entering commands with a touch-tone telephone.
- Flash memory that ensures configurations, statistics and messages are not lost in the event of power failures.
- High-speed Ethernet connection for fast downloading of system configuration and message files.
- Internal modem.

ACD

Automatic Call Distribution

UCD

Uniform Call Distribution

Who Uses XMU+

XMU+ is used by a broad range of industries for a variety of functions such as:

- Passive announcements.
- Interactive announcements.
- Music on hold.
- Public announcements.
- Interactive auto attendants.
- Call processing and transferring.

See *Typical Uses for XMU+* on page 7 for more information about each of the above functions.

About XMUCOM+ Software

The XMUCOM+ software is a Windows-based application that lets you program, download, update, and back up configurations and messages to the XMU+ from a PC. The intuitive XMUCOM+ interface displays configuration outlines and detailed node information. See *XMU+ QuickStart Guide* for more information.

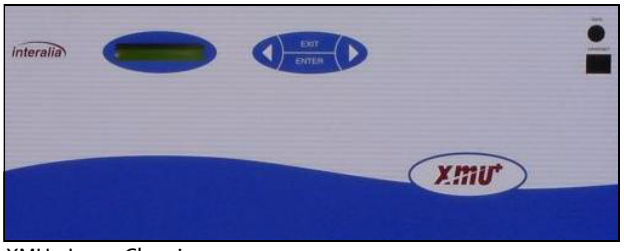
Configurations designed with XMUCOM+ are transmitted to the XMU+ unit through a modem connection, or an Ethernet (LAN-based network or direct) connection. See *Connecting the XMU+ to a PC with XMUCOM+ Software* on page 48 for more information.

Product Overview

XMU+ units are compatible with all major telephone systems and can be remotely managed through a modem or Ethernet connection that uses XMUCOM+ (see *About XMUCOM+ Software* on page 3 for more information).

XMU+ is available in two sizes:

- Large Chassis.
- Small Chassis.



XMU+ Large Chassis

The XMU+ large chassis provides state-of-the-art design, flexible configuration options for users requiring up to:

- 64 analog channels.
- 48 T1 channels.
- 6 hours of recording time for music and messages.

The XMU+ large chassis handles up to 8 line cards for call processing, audiotext, ACD announcements, and auto attendant. With a Music-On-Hold card installed, it can also act as a music/messaging on-hold system with two music inputs and four different outputs.

XMU+ Small Chassis

The XMU+ small chassis provides an effective solution for users requiring only one line card.

The XMU+ small chassis provides up to:

- 8 analog channels.
- 24 T1 channels.

Line Cards Supported by XMU+

Depending on the chassis size, the XMU+ can support several different line cards. As well, each line card may have several variants, depending on the number of ports required and the country of use. See *XMU+ Approvals* on page 143 for more information about XMU+ approving bodies for the countries in which XMU+ is used.

Visit the ***Interalia***® website at www.interalia.com for more information about each line card.

This Line Card...	Lets the XMU+...	Part Numbers	Number of ports
Low Impedance	Provide ACD/UCD messages just like a Hybrid Analog line card, however it can connect one (1) passive line to up to twenty-four (24) PBX trunks.	For use with a Nortel PBX: 47220 47260	 4 8
MWR (Mini Weather Radio)	Broadcast weather information for Environment Canada (available only in Canada).	47366	8
Hybrid Analog	Provide Auto Attendant/Audiotex announcements, 1-800 ACD call routing, and ACD/UCD intercept messages. Hybrid Analog line cards replace the Passive and Interactive Line Cards by combining their features.	47363 47365 For use with a Siemens PBX: 47672 47670	4 8 4 8
T1	Connect to a T1 communication link to provide 24 T1 user channels. The T1 card provides support for industry standard digital communication interfaces.	47367	24

This Line Card...	Lets the XMU+...	Part Numbers	Number of ports
MOH (Music On Hold)	Combine music (from an existing source) and messages to create an “On Hold” environment.	47804	4 output, 2 input

Typical Uses for XMU+

The XMU+ can be used for several different purposes, depending on the chassis size and selected combination of line cards. See *Product Overview* on page 4 and *Line Cards Supported by XMU+* on page 5 for more information.

XMU+ is used as a...	In this manner...
Passive Announcer	An XMU+ equipped with a Hybrid Analog or Low Impedance line card can be used as a Passive Announcement System. Typical uses include: ◆ ACD/UCD customized announcements. ◆ Day of week announcement. ◆ Time of day announcements. ◆ Date specific announcements.

Interactive Auto Attendant	An XMU+ equipped with a Hybrid Analog or T1 line card can be used as an Interactive Auto Attendant System.
	Typical uses include:
	◆ Audiotex/Information lines providing automated messages to callers. An extremely flexible system, the XMU+ can be configured to play different messages depending on:
	  ◆ Time of day.
	  ◆ Day of week.
	  ◆ Date and selections made by a caller.
	◆ Interactive Auto attendants such as:
	  ◆ Press 1 for Sales, Press 2 for Technical Support.
	  ◆ Please enter the extension of the person you wish to speak to.

DTMF

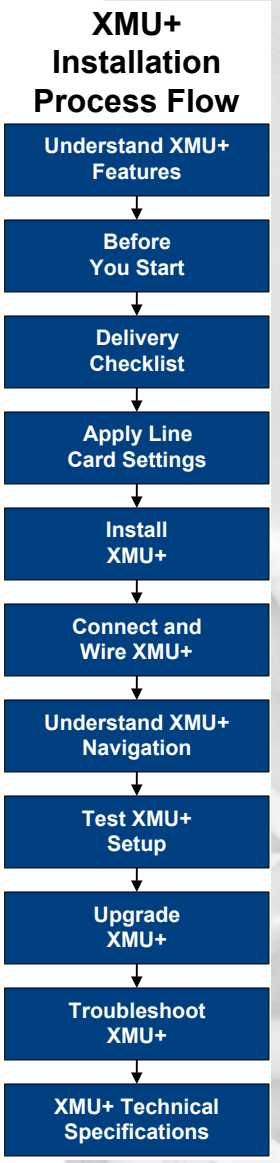
Dual Tone
Multi Frequency

XMU+ is used as a...	In this manner...
DTMF Call Processing	An XMU+ equipped with a Hybrid Analog or T1 line card can be used as a DTMF Call Processing system. Typical uses include Call Center routing with either front ending or back ending ACD queues: ◆ In front-ending ACD queues, XMU+ answers all incoming calls, presents a menu, and transfers the call to the appropriate queue. ◆ In back-ending ACD queues, the client's telephone system answers the call and places the user in the queue. XMU+ plays the appropriate holding messages, and transfers the caller to the requested person when the line becomes available.
Music On Hold Player	An XMU+ equipped with a Music On Hold (MOH) line card can be set up to combine music and messages to create an "On Hold" environment for your callers. The music source (such as a radio or CD) can be: ◆ Stored in and played from a solid state medium on the Control card's flash memory. ◆ Played directly to the MOH from an external audio feed. ◆ Routed through the MOH audio directly to the PBX. Each MOH system provides up to six hours of recording time. Messages can be recorded from four sources: ◆ Telephone handset. ◆ Tape unit. ◆ Remote access using a touch tone telephone. ◆ WAV files that are downloaded using a PC.

In this book

This guide helps you to install the XMU+ unit and perform basic maintenance and upgrade procedures.

Read this chapter...	To understand...
Chapter 1: Introducing XMU+	The XMU+ product and how it can be used to address the needs of your organization.
Chapter 2: Before You Start	The prerequisites for installing the XMU+ unit and the installation procedure you must follow.
Chapter 3: Delivery Checklist	The information you need to provide to others once you have completed the XMU+ installation.
Chapter 4: Applying Hardware Settings to XMU+ Line Cards	How to apply settings to the line cards that accompany your XMU+.
Chapter 5: Installing the XMU+	How to install the XMU+ unit and connect it to its power supply.
Chapter 6: Cabling the XMU+	How to connect and wire the XMU+.
Chapter 7: Understanding XMU+ Navigation	How to configure the XMU+ from the Front Panel or through remote telephone access.
Chapter 8: Testing XMU+ Installation	How to test XMU+ communication with the PBX and with XMUCOM+ software.
Chapter 9: XMU+ Hardware Upgrades	How to perform basic XMU+ maintenance procedures, as well as specific upgrades.
Chapter 10: Troubleshooting XMU+ Installation	Typical errors that users encounter during installation and maintenance, and how to resolve these errors.



Read this chapter...	To understand...
Chapter 11: XMU+ Technical Specifications and Approvals	Additional technical information about the XMU+ unit and accessories.
Glossary	Industry standard terminology used in XMU+ documentation.
Index	An alphabetic list of all the activities and concepts documented in this guide.

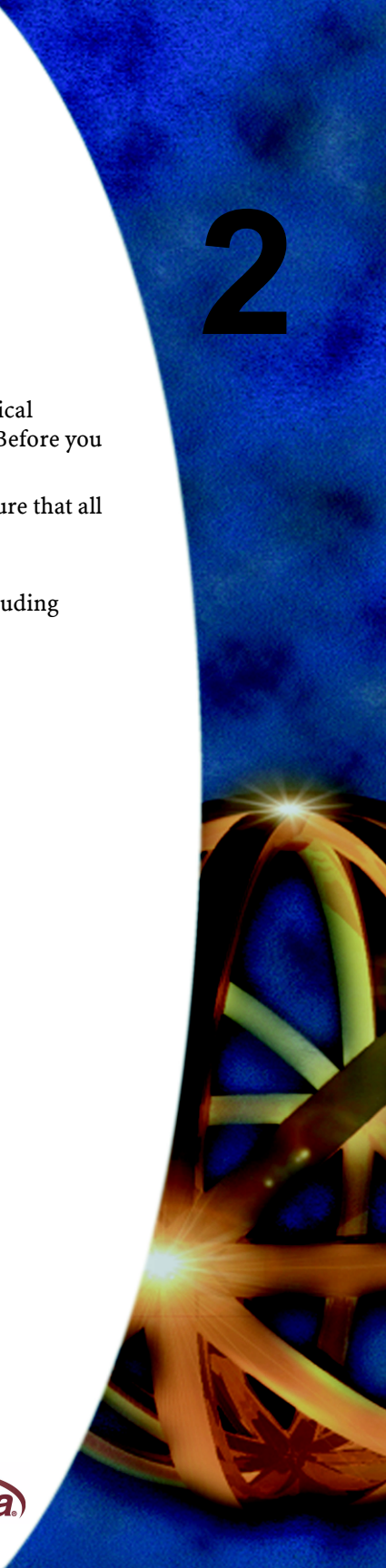
2 Before You Start

Because of its ability to adapt to a variety of situations, the technical features of the XMU+ unit ordered by your company are unique. Before you start to install the XMU+ unit, you should:

- Unpack the XMU+ unit, using the checklists provided, to ensure that all required components are available.
- Identify the features of your particular XMU+ unit.
- Understand the general requirements of the XMU+ unit, including environmental, power connection, and PBX requirements.

In this chapter...

- *Before You Start Activities* on page 13.
  - *Line Card Checklist* on page 14.
- *XMU+ Features* on page 15.
- *Meeting System Requirements* on page 16.
  - *Environmental Requirements* on page 16.
  - *Power Requirements* on page 17.
  - *PBX Requirements* on page 17.



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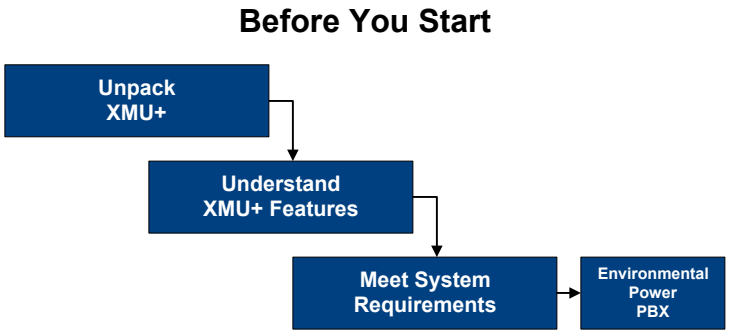
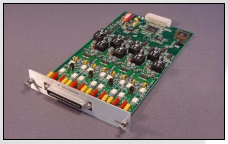
Before You Start Activities

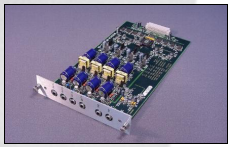
Complete the following activities before you start to install the XMU+:



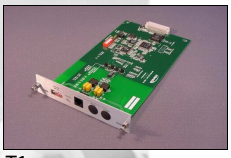
1. Unpack the XMU+ and its hardware accessories.
2. Identify the features unique to your XMU+. See *XMU+ Features* on page 15 for more information.
3. Ensure all requirements are met for XMU+ installation. These requirements include:
   - Environmental requirements. See *Environmental Requirements* on page 16 for more information.
   - Power requirements. See *Power Requirements* on page 17 for more information.
   - PBX requirements. See *PBX Requirements* on page 17 for more information.

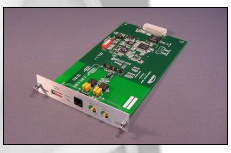
Line Card Checklist


Hybrid Analog


MOH

MWR


T1


Low Impedance

The call processing features of the XMU+ can be made even more flexible and user-specific with the addition of one or more line cards.

Use the following checklist to ensure that all line cards ordered for the XMU+ have been pre-installed in the XMU+, and to record the slot numbers in which they are installed. Record this information in the Delivery Checklist, as well.

There can be more than one of a particular type of line card installed, depending on the planned functionality of this XMU+.

- ☐ Hybrid Analog Part #: _____ Slot #: _____
- ☐ MOH Part #: _____ Slot #: _____
- ☐ MWR Part #: _____ Slot #: _____
- ☐ T1 Part #: _____ Slot #: _____
- ☐ Low Impedance. Part #: _____ Slot #: _____

See *Line Cards Supported by XMU+* on page 5 and *Cabling XMU+ Line Cards* on page 54 for more information about individual line cards and part numbers.

XMU+ Features

The XMU+ is a microprocessor-based voice announcement and call processing system. It is modular in design, field upgradeable, and available in two sizes. Systems interface with XMU+ through the ports and cards installed on the rear panel, while users interface with XMU+:

- Through its Front Panel (see *Understanding the XMU+ Front Panel* on page 81).
- Remotely via telephone (see *Using Remote Telephone Access* on page 88).
- With XMUCOM+ software (see *About XMUCOM+ Software* on page 3).

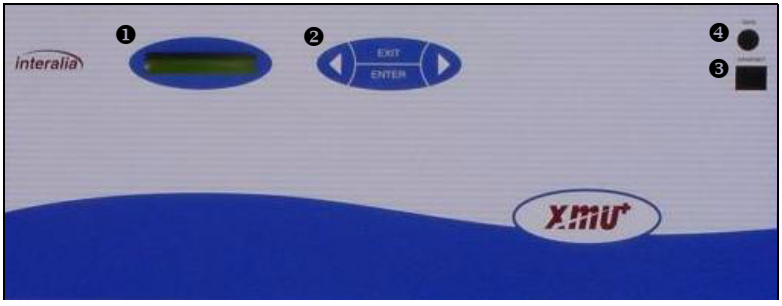
See *XMU+ Technical Specifications and Approvals* on page 135 for more detailed information about XMU+'s technical specifications.

Front Panel

Both the small and large XMU+ chassis provide the same Front Panel features:

Small Chassis

Large Chassis



Feature...	Function...
❶ 2 x 16 Character Display	The LCD shows function information and line status to the operator/programmer.
❷ Function (Arrow) Keys	Four buttons for selecting and configuring XMU+ functions.
❸ Handset Input/Output	A port to connect a handset to record or play back messages.
❹ Recording Source Input/Output	A port to connect a recording source (such as a tape deck) to record messages.

Meeting System Requirements

Before you begin to install the XMU+ unit, you need to ensure that XMU+ system requirements are met. These requirements include:

- *Environmental Requirements* on page 16.
- *Power Requirements* on page 17.
- *PBX Requirements* on page 17.

Environmental Requirements

For optimum operation of the XMU+ unit, ensure that the XMU+ is placed in an environment that meets the following requirements:

- Rack, wall, or shelf space is available for proper mounting.
  If mounting on a rack, it must be 19". A 23" rack can be used if a 23" rack mounting bracket is ordered with the XMU+ unit. Record the rack size and mounting method in *The XMU+ Delivery Checklist* on page 21.
- The XMU+ is designed to operate within a 0 - 40 degrees ºC (32 - 104ºF) temperature range. Adequate cooling or heating must be provided to guarantee this range.

HVAC

Heating, Venting, and Air Conditioning.

- HVAC requirements must also be met:
  The large chassis XMU+ produces a maximum of 750 BTU/hour of waste heat, while the small chassis XMU+ produces a maximum of 160 BTU/hour of waste heat.

Note: The actual amount of waste heat generated by the XMU+ depends on the number and type of line cards and Power Supply cards installed.

See *Chapter 11: XMU+ Technical Specifications and Approvals* for more detailed thermal information.

Power Requirements

Depending on the number and types of line cards installed, the large chassis XMU+ can consume as much as 220 Watts, while the small chassis XMU+ can consume as much as 50 Watts. See *Chapter 11: XMU+ Technical Specifications and Approvals* for more power consumption information.

To meet XMU+ power requirements, ensure that the necessary power sockets (AC or DC) are available, unoccupied, and have a protective earth/ground connection.

Note: Since the AC power cord is the disconnect for the XMU+, ensure that the AC receptacle is near the unit. See *XMU+ Approvals* on page 143 for more information.

Bitte beachten Sie die wichtien Sicherheits informationen auf Seite 135, *XMU+ Technical Specifications and Approvals*.

UPS

Uninterruptible Power Supply

If the operation on a UPS is required, ensure that the appropriate UPS requirements (power and runtime) are determined.

- The power rating must be at least that of the XMU+ system. (See *Chapter 11: XMU+ Technical Specifications and Approvals* for specific XMU+ system ratings).
- The amount of runtime is up to the user.

For a large chassis XMU+, the dual Power Supply cards can be used to provide a degree of power supply diversity. For example, two AC supplies could be used, each connected to a different branch circuit.

PBX Requirements

The functionality of the XMU+ is dependent on the type of PBX (switch) with which it is used. See *Cabling XMU+ Line Cards* on page 54 for more information. Before you begin to install the XMU+ unit, you should identify your PBX and ensure that the information is readily available by recording it below, as well as in *The XMU+ Delivery Checklist* on page 21.

Your PBX Information

Switch manufacturer: _____

Model name: _____

Model number: _____

3 Delivery Checklist

The installer must collect initial XMU+ installation and configuration information, and record it in *The XMU+ Delivery Checklist* on page 21 for those who may:

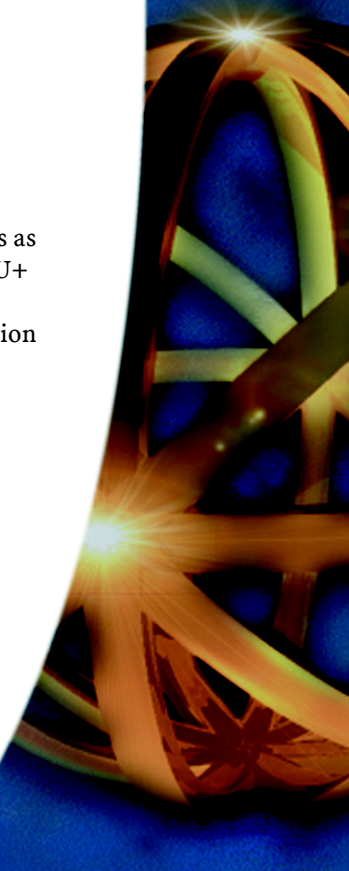
- Use XMUCOM+ software to configure the XMU+. See the *XMU+ QuickStart Guide* for more information about configuring XMU+.
- Perform standard maintenance or upgrades on the XMU+. See *Chapter 9: XMU+ Hardware Upgrades*.
- Troubleshoot the XMU+ at a later date. See *Chapter 10: Troubleshooting XMU+ Installation*.

In this chapter...

- *Preparing the XMU+ Delivery Checklist* on page 19.
- *The XMU+ Delivery Checklist* on page 21.

Preparing the XMU+ Delivery Checklist

The XMU+ Delivery Checklist on page 21 should be prepared by installers as they are installing the XMU+, and should be updated whenever the XMU+ or its configurations are upgraded. The Delivery Checklist provides cross-references to the appropriate sections in this manual for easy location of required information at a later date.



The XMU+ Delivery Checklist

Initial XMU+ installation information should be collected by the installer and recorded in the Delivery Checklist for later use. This information can include:

- *Physical Specifications* on page 21.
- *Configuration Specifications* on page 23.
- *Communication Specifications* on page 25.

This list should be updated whenever the XMU+ or its configurations are upgraded.

Physical Specifications

Installation Specifications

Serial number of this XMU+. The serial number is found on the top edge of the XMU+ unit.	_____
Large or small chassis?	☐ Large ☐ Small
Physical location of XMU+ unit.	_____
Is the XMU+ mounted on a wall or shelf?	☐ Yes ☐ No
Is the XMU+ mounted on a rack?	☐ Yes ☐ No
If yes, what is the size of the rack (19” or 23”)?	☐ 19” ☐ 23”

See *Environmental Requirements* on page 16.

Power Supply Specifications

Power Supply card part #.	_____
What is the XMU+ primary power supply?	☐ AC ☐ DC
Is there a secondary power supply?	☐ Yes ☐ No
If yes, what is the secondary power supply?	☐ AC ☐ DC

Control Card Specifications

Control card part #?
See *Cabling the XMU+ Control Card* on page 47. _____

Is Telephone Remote Access set up? ☐ Yes ☐ No

If yes, what is the:

- Remote Access mode? See *To set XMU+ Remote Telephone Access mode* on page 86. _____
- Remote Access code? See *To change the default Remote Telephone Access code* on page 87. _____
- Remote Access telephone number. See *Connecting Remote Telephone Access (optional)* on page 51. _____

Are alarms connected? ☐ Yes ☐ No

If an alarm connector was used, where do the signals go? _____

Line Cards Installed	Line Card Name	Line Card Part #	Total # of Lines	Operating Mode
See *Line Card Checklist* on page 14. More than one of a particular type of line card can be installed.		See *Line Card Checklist* on page 14.	See *Matching XMU+ Cables and Connectors* on page 43.	See *To set line card operating modes* on page 102.
Slot# 1				
Slot# 2				
Slot# 3				
Slot# 4				
Slot# 5				
Slot# 6				
Slot# 7				
Slot# 8				

Configuration Specifications

Firmware Specifications	
Current firmware version installed. See *To check system startup* on page 38.	_____

Message Specifications	
Available Memory (recording time).	_____
Has partitioning been enabled?	☐ Yes ☐ No
If yes, how many partitions have been configured?	_____
Messages available per partition.	_____

Hybrid Analog Hardware Settings	Slot #
# of cards installed (up to 8):	See *Physical Specifications* on page 21
Card #1	_____
Card #2	_____
Card #3	_____
Card #4	_____
Card #5	_____
Card #6	_____
Card #7	_____
Card #8	_____

MOH Hardware Settings	Slot #	Jumper Settings
# of MOH cards installed (up to 4). _____	*Line Card Checklist* on page 14.	See *To set MOH Jumper Settings* on page 31.
MOH Card #1	_____	_____
MOH Card #2	_____	_____
MOH Card #3	_____	_____
MOH Card #4	_____	_____

T1 Hardware Settings	Slot #	Primary Settings	Secondary Settings
# of T1 cards installed (up to 2): _____	See *Physical Specifications* on page 21.	See the RJ45 pin-out diagram in Chapter 3 of the *XMU+ Installation Handbook*.	See Chapter 3 of the *XMU+ Installation Handbook*.
T1 Card #1	__1_____	_____	_____
T1 Card #2	__5_____	_____	_____

Communication Specifications

Contact the appropriate department (usually the IT department) if the following information is not readily available.

Telephone and Extension Specifications	
# of available telephone numbers. What are the telephone numbers (or range of numbers)?	_____ _____
# of available extensions. What are the extension numbers (or range of extension numbers)?	_____ _____
# of extensions required (must be less than or equal to the number of extensions available).	_____

PBX Specifications	
Who is the PBX (switch) manufacturer?	_____
What is the PBX model name?	_____
What is the PBX model number?	_____
What year was the PBX manufactured (approximately)?	_____

XMU+ to XMUCOM+ Communication Specifications

Which communication option was chosen for communication between XMU+ and XMUCOM+: _____

- Modem.
- Ethernet (LAN).
- Ethernet (direct).

See *Connecting the XMU+ to a PC with XMUCOM+ Software* on page 48.

If a modem connection was set up, what is the telephone number? _____

If an Ethernet connection was set up, what is the:

- IP address? _____
- IP netmask? _____
- IP gateway subnet? _____

4

Applying Hardware Settings to XMU+ Line Cards

Each XMU+ line card is unique, in both its design and its effect on the functional capabilities of the XMU+. Some XMU+ line cards require specific settings to be applied so they can perform appropriately with your PBX. These line cards include:

- MOH. See *Applying MOH Line Card Settings* on page 31.

ESD

Electrostatic Discharge

Caution: The application and modification of settings for XMU+ line cards should only be completed by a qualified telecommunications / electronics technician. Standard static discharge precautions must be followed when handling any internal components. ESD precautions should also be observed.

Interalia® cannot be held responsible for damage to parts or equipment caused by improper handling or installation.

In this chapter...

- *Applying Hardware Settings Activities* on page 29.
- *Understanding Line Card Population Rules* on page 30.
- *Applying MOH Line Card Settings* on page 31.

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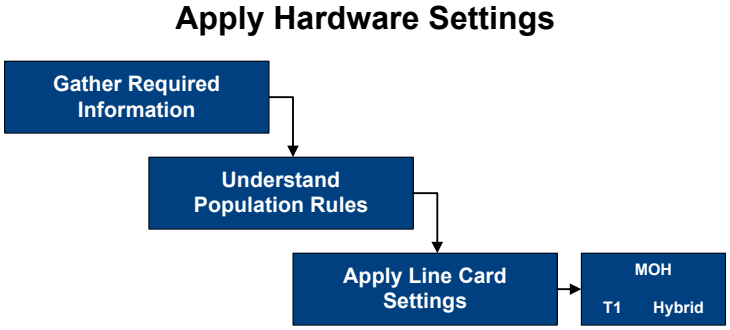
Applying Hardware Settings Activities

Complete the following activities to apply the appropriate settings to XMU+ line cards:



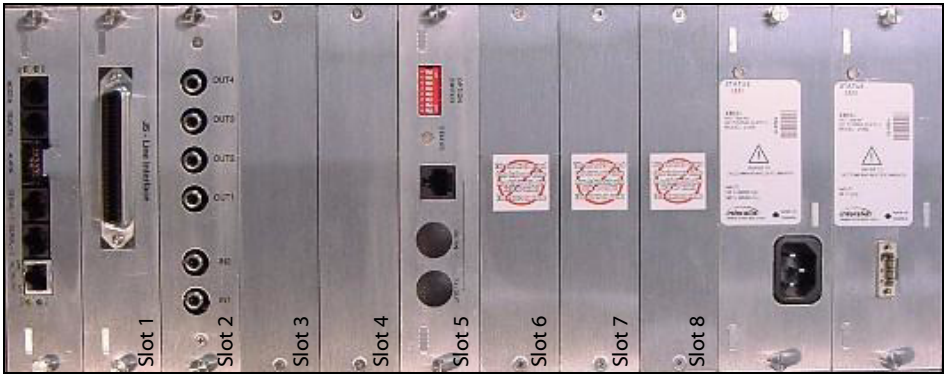
1. Ensure that the following information has been gathered, and is close at hand:
   - PBX information. See *PBX Requirements* on page 17 for more information.
   - Identify the slots into which the Hybrid Analog, T1 or MOH line cards were pre-installed in your XMU+. See *Line Card Checklist* on page 14 for more information.
2. Understand population rules for line card placement. See *Understanding Line Card Population Rules* on page 30 for more information.
3. Apply hardware settings to the appropriate line cards. See the following for more information:
   - MOH. See *Applying MOH Line Card Settings* on page 31.

Understanding Line Card Population Rules

The XMU+ small chassis has one slot for placement of a line card, while the XMU+ large chassis has eight slots for line card placement.

Small Chassis

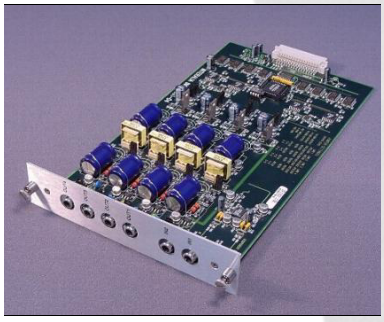
Large Chassis



Line cards have associated population rules that determine the slots in which they can be placed in the XMU+ unit. Installing more than the advised number of line cards, or installing a line card in an invalid slot, could cause the XMU+ system to fail.

- Small Chassis: Maximum of one (1) card of any type.
- Large Chassis:
  - Maximum of four (4) MOH cards @ 8ohm or eight (8) @ 600 ohm.
  - Maximum of two (2) T1 cards in an XMU+ large chassis.
    T1 cards can only be placed in the 1st and 5th slots, since they control not only the slot they are placed in, but also the following 3 slots.
    For example, when a T1 card is plugged into slot 5, it controls slots 5 to 8, but slots 1 to 4 are still available for other line cards. If T1 line cards are placed in both slot 1 and slot 5, no other cards can be added.
  - Maximum of eight (8) Hybrid Analog line cards.
- Usually, unusable slots display a faceplate with the following warning sticker:

Applying MOH Line Card Settings



The MOH line card combines music and messages to create an 'On Hold' environment for callers that are on hold. Music and messages can be recorded within the XMU+, or the music can be provided from an external source. You can install one MOH line card in an XMU+ small chassis, and up to four MOH line cards in an XMU+ large chassis.

Each MOH card has two input slots for use when music is provided by an existing external source, such as Muzak.

The MOH card also has four output slots that connect to the MOH inputs on a PBX. These audio outputs are used in one of two ways:

- To output messages in combination with an existing music source.
- To output music and messages that reside in the XMU+.

These inputs and outputs are located on the MOH line card's face plate, as shown below:

To set MOH Jumper Settings

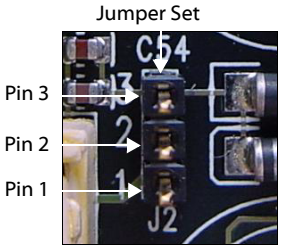
By default, the MOH line card is set to 600Ω output impedance. If 8Ω output impedance is required for any of the four MOH outputs, you will need to apply the following jumper settings to the appropriate jumper on the MOH line card.

The four sets of 8Ω/600Ω jumpers are located on the side of the MOH line card. Each set of jumpers corresponds to an MOH output:

This MOH output...	Corresponds to this set of jumpers...
OUT4	J2
OUT3	J4
OUT2	J18
OUT1	J11

1. Locate the MOH line card in the back of the XMU+ unit.
   See *Line Card Checklist* on page 14 for more information.
2. Loosen the two thumbscrews on either end of the line card's faceplate.
3. Pull the line card straight out.
4. Locate the four sets of 8Ω/600Ω jumpers on the side of the line card, as shown below.

5. Set one set of jumpers by applying clips to the following pins:
   - Pins 1-2 for 8Ω.
   - Pins 2-3 for 600Ω.



6. Repeat step 5 until the correct jumper settings have been applied to each of the four sets of jumpers.
7. Line up the line card's circuit board on the plastic rails in the chassis.
8. Slide the line card into place.
   When seating the line card, there should be slight resistance. Do *not* force the line card into place.
9. Tighten the thumbscrews.
10. Repeat Steps 1 to 8 until the appropriate jumper settings have been applied to all MOH line cards in the XMU+.

Caution...

Forcing the line card into place could bend the pins on the connector.

5

Installing the XMU+

The XMU+ unit must be installed in a location that meets all the requirements detailed in *Meeting System Requirements* on page 16. The installation process consists of physical installation at the appropriate location, connecting the XMU+ to its designated power supply, and checking system startup.

Before beginning the installation process, line card settings must be applied to the appropriate line cards. See *Chapter 4: Applying Hardware Settings to XMU+ Line Cards*.

ESD

Electrostatic Discharge

Caution: The installation of an XMU+ unit should only be completed by a qualified telecommunications / electronics technician. Standard static discharge precautions must be followed when handling any internal components. ESD precautions should also be observed.

Interalia® cannot be held responsible for damage to parts or equipment caused by improper handling or installation.

In this chapter...

- *Installation Activities* on page 35.
- *Installing the XMU+ Unit* on page 36.
- *Checking System Startup* on page 38.

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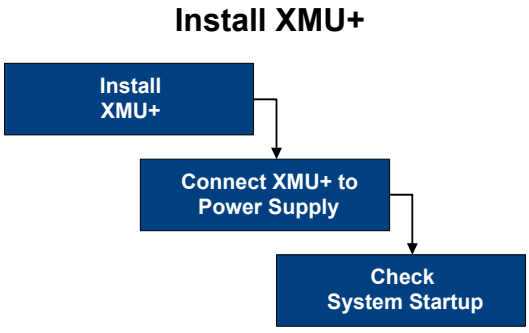
Installation Activities

Complete the following activities to install the XMU+:



1. If required, install the XMU+ in a rack or on a wall.
   See *To install an XMU+ in a rack* on page 36 or *To mount an XMU+ to a wall* on page 37 for more information.
2. Connect the XMU+ to its power supply. For the large chassis, could be to one or both of the following power supplies:
   - AC power.
   - DC power.

   See "Connecting the XMU+ to its Power Supply" in Chapter 2 of the *XMU+ Installation Handbook* for more information.
3. Check to ensure proper system startup. See *Checking System Startup* on page 38 for more information.

Installing the XMU+ Unit

Before installing the XMU+ unit, you should ensure that all system requirements have been met (see *Meeting System Requirements* on page 16) and that all of the appropriate line cards settings have been applied (see *Applying Hardware Settings to XMU+ Line Cards* on page 27).

As well, you should ensure that the following tools, hardware, and accessories are near:

- The XMU+ unit.
- Mounting brackets and screws.
- Philips screwdriver.

To install an XMU+ in a rack

1. Ensure you have the mounting brackets.
2. Attach the rack mounting bracket to the XMU+ with the screws provided, as shown below:

Small Chassis

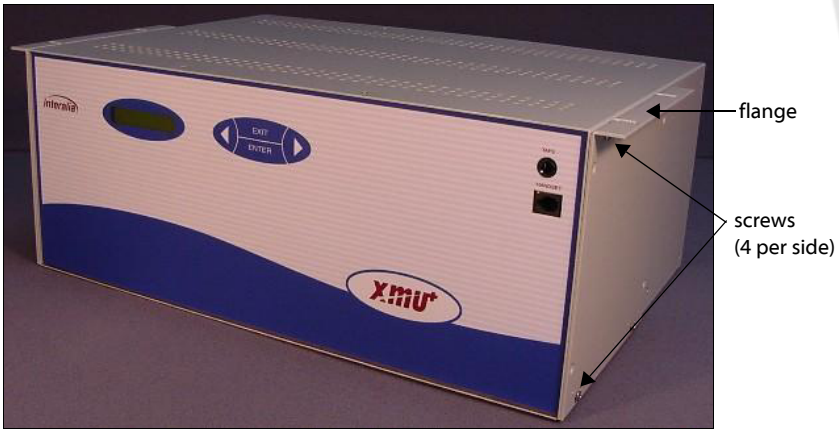
Large Chassis

3. Install the XMU+ in the rack using the flanges of the mounting brackets.

To mount an XMU+ to a wall

19" rack mounting brackets can be turned 90° and used to mount a large chassis XMU+ on a wall. Small chassis XMU+ units must be ordered with specific wall mounting brackets.

1. Attach the mounting brackets to the XMU+ with the screws provided, as shown below:



2. Use appropriate screws to mount the XMU+ to a plywood backboard.

Note: Do ***not*** mount the XMU+ directly to standard wall board material.

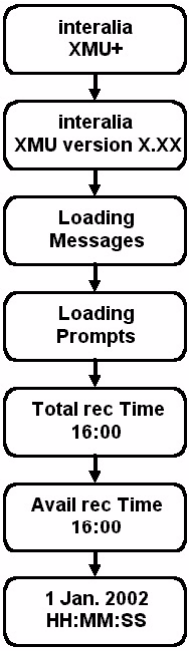
Checking System Startup

At system startup, the XMU+ identifies the current system configuration. You should watch the information displayed on the LCD to ensure that the XMU+ is working correctly.

Since the system configuration information may be required at a later date for maintenance and upgrades, you should record it in the Delivery Checklist. See the *Configuration Specifications* section of *The XMU+ Delivery Checklist* on page 21.

To check system startup

1. Attach the XMU+ to the appropriate power supply.
2. Verify that the LCD illuminates.
3. Verify that the XMU+ identifies the current system configuration in the following order:
   - The current firmware version installed.
   - Proper loading of messages and prompts.
   - The total amount of recording time currently installed.
   - The amount of recording time that is currently available.
   - The date and time.
     The date and time may have to be reset to show the correct values. See *To set time and date (from the Front Panel)* on page 96.



6

Cabling the XMU+

Cabling the XMU+ involves connecting and/or wiring each line card to the appropriate PBX, transmitter, or amplifier. In addition, it involves cabling the Control card to the appropriate connections, which could include:

- Alarm connection.
- Telephone lines for Remote Access and modem connections.
- Ethernet (network or direct) connection.

ESD

Electrostatic Discharge

Caution: The cabling of the XMU+ to the PBX should only be completed by a qualified telecommunications / electronics technician. Standard static discharge precautions must be followed when handling any internal components. ESD precautions should also be observed.

Interalia® cannot be held responsible for damage to parts or equipment caused by improper handling or installation.

In this chapter...

- *Cabling Activities* on page 41.
- *Preparing to Cable the XMU+* on page 42.
- *Cabling the XMU+ Control Card* on page 47.
- *Cabling XMU+ Line Cards* on page 54.
- *Common Interface Tables (By Application)* on page 56.
- *About XMU+ Operating Modes* on page 68.

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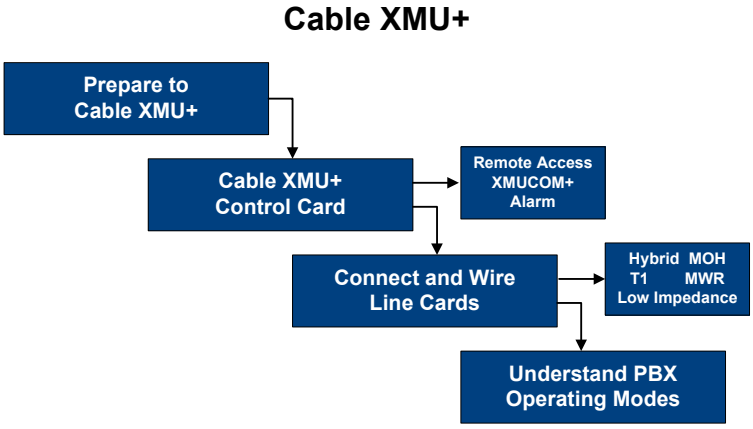
Cabling Activities

Complete the following activities to connect and wire the XMU+:



1. Ensure that the appropriate preparations are taken before cabling the XMU+.
   See *Preparing to Cable the XMU+* on page 42.
2. Cable the Control card to the appropriate connections.
   See *Cabling the XMU+ Control Card* on page 47.
3. Connect and wire the appropriate XMU+ line cards using the *Common Interface Tables (By Application)* on page 56. See the following for more information:
   - *To cable Hybrid Analog line cards* on page 54.
   - *To cable Low Impedance cards* on page 54.
   - *To cable T1 line cards* on page 54.
   - *To cable MOH line cards* on page 55.
   - *To cable MWR line cards* on page 55.
4. Understand PBX operating modes.
   See *About XMU+ Operating Modes* on page 68.

Preparing to Cable the XMU+

To properly cable the various Control card connections, as well as to wire and connect XMU+ line cards to the PBX, you should ensure that the following prerequisites have been met:

- Ensure that all system requirements have been met.
  See *Meeting System Requirements* on page 16.
- Ensure that the appropriate cables are available for connecting and wiring the XMU+.
  See *Matching XMU+ Cables and Connectors* on page 43.
  As always, cables should be properly managed during XMU+ connecting and wiring, and properly stored after installation.
- Match the connector pinouts to specific line cards.
  See *Matching Connector Pinouts to XMU+ Line Cards* on page 45.
- Understand the PBX table conventions used in this chapter.
  See *PBX Interface Table Conventions and Abbreviations* on page 42.

PBX Interface Table Conventions and Abbreviations

The following color abbreviations are used in the PBX interface tables (see *Common Interface Tables (By Application)* on page 56):

Abbreviation...	Cable Color...	Abbreviation...	Cable Color...
Blk	Black	Grn	Green
Brn	Brown	Blu	Blue
Red	Red	Vlt	Violet
Org	Orange	Slt	Slate
Yel	Yellow	Wht	White

In addition, the following conventions are used in the PBX interface tables (see *Common Interface Tables (By Application)* on page 56):

This Convention...	Identifies...
Pin	The pin number on the 50 position connector.
Color	The wire color/stripe color for the wire corresponding to the pin on the 50 position connector.
*	The signal from PBX power supply or system ground.

Matching XMU+ Cables and Connectors

Use the following table to match Control card and line card connectors to the appropriate cables and mating connectors. While Control card connectors are the same on every XMU+ unit, the number and type of line cards can vary. See *Line Card Checklist* on page 14 for a list of the line cards pre-installed in the XMU+.

Some cables are shipped with the XMU+, but others may need to be purchased separately. See "Cable Checklist" in Chapter 1 of the *XMU+ Installation Handbook* for a list of cables shipped with this XMU+.

XMU+ Card...	Connector on card...	Used to...	Requires connector and cable...
Control Card	MODEM - RJ-11 connector	Communicate with XMUCOM+.	RJ-11 Mating Connector (telephone jack) and telephone cable.
	REMOTE - RJ-11 connector	Program messages from a remote location using a touch tone telephone.	RJ-11 Mating Connector (telephone jack) and telephone cable.
	ALARM - Alarm Connector	Connect alarm circuitry.	Alarm Mating Connector and ribbon cable.
	SERIAL-1	Perform future applications.	
	SERIAL-2	Perform future applications.	
	NETWORK - RJ-45	Set up connections to XMUCOM+ software via an Ethernet network.	RJ-45 to RJ-45 (6ft.) Category 5 UTP network connector and cable for LAN connection.
Low Impedance Line Card	J5 - RJ-21 Female Connector	Perform ACD/UCD applications only.	Amphenol RJ-21 50-pin male connector and cable.
MWR Line Card	J5 - RJ-21 Female Connector	Perform MWR applications only.	Amphenol RJ-21 50-pin male connector and cable.

ACD
Automatic Call Distribution

MWR
Mini Weather Radio

MOH
Music On Hold

CAT5
Standard Category 5

XMU+ Card...	Connector on card...	Used to...	Requires connector and cable...
MOH Line Card	2 RCA /Phono Inputs 4 RCA/ Phono Outputs	Perform MOH applications only.	Standard RCA/Phono connector and suitable coaxial cable.
Hybrid Analog Line Card	J5 - RJ-21 Female Connector	Perform ACD, Call Processing, and Auto Attendant applications.	Amphenol RJ-21 50-pin male connector and cable.
T1 Line Card	RJ-45 Female Connector	Perform ACD, Call Processing, and Auto Attendant applications.	RJ-45 mating connector and Standard Category 5 (CAT5) UTP cable.

Matching Connector Pinouts to XMU+ Line Cards

Most XMU+ line cards are cabled using the *RJ-21 50-pin Connector* on page 45. Exceptions include:

- The MOH line card, which uses the *RCA/Phono Connectors* on page 46.
- T1 line cards, which use a digital signal to connect to the XMU+.

All connectors are used to connect and wire the line cards to a PBX, as described in the various PBX interface tables found in *Cabling XMU+ Line Cards* on page 54.

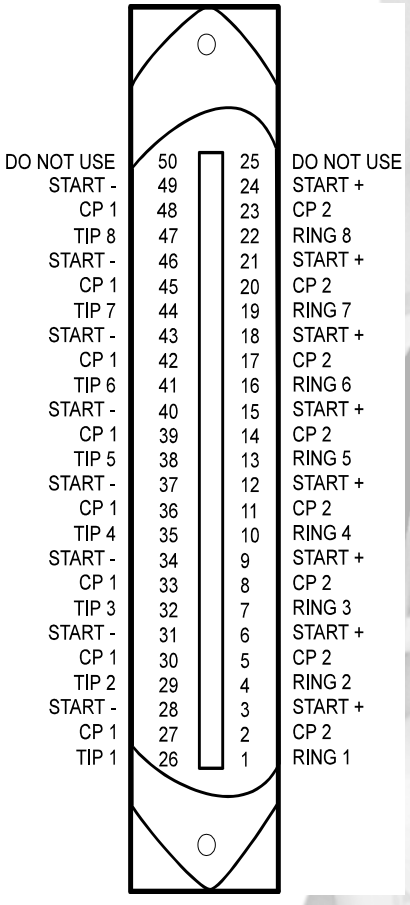
RJ-21 50-pin Connector

Use the Amphenol RJ-21 50-pin Connector to connect the following line cards to telephone lines or PBX trunks:

- Hybrid Analog line card. See *To cable Hybrid Analog line cards* on page 54 for more information.
- Low Impedance line card. See *To cable Low Impedance cards* on page 54 for more information.
- MWR line card. See *To cable MWR line cards* on page 55 for more information.

Each line on the Amphenol 50-pin connector has a tip (-)/ring (+) pair. The tip/ring pair performs like a regular telephone extension operating in the Ring Start Mode (see *About XMU+ Operating Modes* on page 68 for more information).

For lines operating in other modes, the tip/ring pair provides the message audio path.


DO NOT USE 50 25 DO NOT USE
START - 49 24 START +
CP 1 48 23 CP 2
TIP 8 47 22 RING 8
START - 46 21 START +
CP 1 45 20 CP 2
TIP 7 44 19 RING 7
START - 43 18 START +
CP 1 42 17 CP 2
TIP 6 41 16 RING 6
START - 40 15 START +
CP 1 39 14 CP 2
TIP 5 38 13 RING 5
START - 37 12 START +
CP 1 36 11 CP 2
TIP 4 35 10 RING 4
START - 34 9 START +
CP 1 33 8 CP 2
TIP 3 32 7 RING 3
START - 31 6 START +
CP 1 30 5 CP 2
TIP 2 29 4 RING 2
START - 28 3 START +
CP 1 27 2 CP 2
TIP 1 26 1 RING 1

RCA/Phono Connectors

Use RCA/Phono connectors to connect MOH line cards to a PBX and/or an external music source. The two MOH input slots are used when music is provided by an existing external source, such as Muzak. The four MOH output slots connect to the MOH inputs on the PBX.

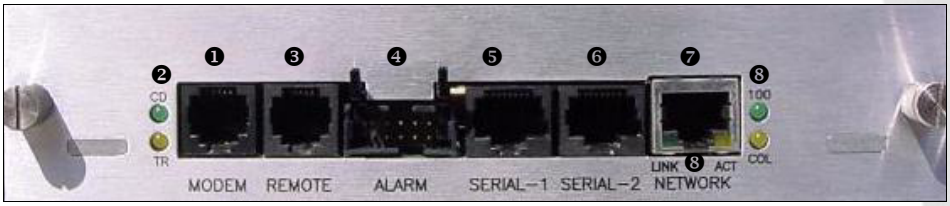
The following table outlines these input/output slots:

These connectors...	Do this...
IN1 IN2	Accepts a wide dynamic range of audio input (20mVrms to 1.6Vrms) to yield good recording quality audio.
OUT1 OUT2 OUT3 OUT4	◆ 600Ω output impedance drives a high impedance load such as “Line in” of a PA system, Music on Hold input of a key system, transmitter input, etc. ◆ 8Ω output impedance drives standard 8Ω speakers. ◆ Each output volume is adjustable up to the following levels: - 8Ω - 1.0W@2.8Vrms. - 600Ω - 13mW@2.8Vrms (8Vpp or =9dBm).

See *XMU+ Technical Specifications and Approvals* on page 135 for more detailed technical specifications.

Cabling the XMU+ Control Card

The XMU+ Control card must be cabled to handle the inputs and outputs from alarms, remote access, and PC communications. The Control card has 6 connector ports, as shown below:



This Port...	Is used by XMU+ to...	See...
❶ MODEM (RJ-11 connector)	Provide external communication with XMUCOM+ software.	*To connect to the PC with an analog line to modem* on page 49.
❷ Modem Status Indicators	The indicator displays the MODEM port status: ◆ Green - carrier detect. ◆ Yellow - transmit and receive data.	
❸ REMOTE (RJ-11 connector)	Program messages from a remote location using a touch tone telephone.	*Connecting Remote Telephone Access (optional)* on page 51.
❹ ALARM (2 x 5 header connection)	Connect XMU+ to alarm circuitry.	*Connecting Alarms (optional)* on page 52.
❺ SERIAL-1 (RS-232 connector)	Provide future applications.	TBA.
❻ SERIAL-2 (RS-232 connector)	Provide future applications.	TBA.
❼ NETWORK (RJ-45 connector)	Provide external communication with XMUCOM+ software.	*To connect to the PC through an Ethernet (LAN) Network* on page 50.
❽ Network Status Indicators	The indicators display the NETWORK port status: ◆ Green (in connector)- link. ◆ Yellow (in connector) - activity (transmit and receive data). ◆ Green - 100 Base T (when on) and 10 Base T (when off). ◆ Yellow - collision.	

Connecting the XMU+ to a PC with XMUCOM+ Software

The XMUCOM+ software is a Windows based program that allows you to program, download, update, and backup configurations and messages to the XMU+ from a PC. See the *XMU+ QuickStart Guide* for more information about XMUCOM+ software and configurations.

Users that have multiple XMU+ units distributed across several geographical sites must consider how to interconnect and communicate with the various units. Depending on the location, available network facilities, and modem capabilities of the XMUCOM+ system and XMU+ units, users can choose to apply a combination of one or more of the following communication methods for each of their XMU+ sites:

Use...	To let the XMU+ communicate with XMUCOM+...
Modem Connection	Through a dial-up modem connection. This method is effective for sites that are not linked through LAN/WAN networks. Modem connections require PC's with a modem, and the modem phone numbers for the XMU + unit. See *To connect to the PC with an analog line to modem* on page 49 for more information.
Ethernet (LAN) Connection	Through LAN/WAN networks. This method is effective for organizations that have existing LAN/WAN networks operating at all XMU+ sites. Ethernet connections require: ◆ A network card to be installed within the XMUCOM+ PC. ◆ Both the PC and XMU+ unit be connected to the network for LAN access. ◆ A fixed IP address for the XMU+ unit. ◆ An IP address for the XMUCOM+ (Admin) PC. See *To connect to the PC through an Ethernet (LAN) Network* on page 50 for more information.

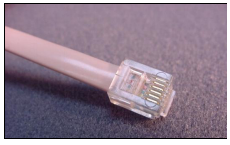
Use...	To let the XMU+ communicate with XMUCOM+...
Direct Ethernet Connection	With a non-LAN Ethernet connection by connecting the network port of a PC directly to the network port on the XMU+ using an Ethernet cable. Use this method if your PC is equipped with a network card, but does not have an available LAN to connect with. The Ethernet cable creates a separate network connection between the PC and the XMU+ unit. Direct Ethernet connections require: ◆ A network card to be installed within the XMUCOM+ PC. ◆ An Ethernet Cable. ◆ An IP address for the XMU+ unit (default on unit is 192.168.100.2) ◆ An IP address for the XMUCOM+ (Admin) PC. See *To connect to the PC directly with the Network port* on page 50 for more information.

The best way for XMU+ to communicate with XMUCOM+ depends on the communication systems currently available in the environment in which the XMU+ will be placed. Record the communication option chosen in the Delivery Checklist. See *The XMU+ Delivery Checklist* on page 21.

Note: Ideally, the XMUCOM+ software and the XMU+ unit should be installed concurrently so that full testing can be completed. See *Testing XMU+ Line Connections* on page 100 and the *XMU+ QuickStart Guide* for more information.

To connect to the PC with an analog line to modem

The XMU+ provides a modem access port, which is accessed through the MODEM connector on the Control card. See *Cabling the XMU+ Control Card* on page 47 for more information. An analog line is connected (using a standard telephone jack and cable) to the XMU+.



POTS Line

POTS

Plain Old Telephone Service

1. Ensure that a vacant, active telephone outlet is nearby. If one is not nearby, install one. Always take the following safety precautions when installing or modifying telephone lines:
   - Never install wiring during a lightning storm.
   - Never install a jack in a wet location unless the jack is specifically designed for wet locations.
   - Never touch uninsulated wires or terminals unless the lines have been disconnected at the network interface.
2. Connect the one end of the POTS line to the RJ-11 modem port on the XMU+.
3. Plug the free end of the POTS line into the vacant, active telephone outlet.

To connect to the PC through an Ethernet (LAN) Network

The XMU+ provides a RJ-45 port to connect to the XMU+ to a PC via a network. See *Cabling the XMU+ Control Card* on page 47 for more information.

1. Ensure that a vacant, active network outlet is nearby. If one is not nearby, install one. Always take the following safety precautions when installing or modifying network lines:
   - Never install wiring during a lightning storm.
   - Never install a jack in a wet location unless the jack is specifically designed for wet locations.
   - Never touch uninsulated wires or terminals unless the lines have been disconnected at the network interface.
2. Connect one end of the RJ-45 to RJ-45 cable to the NETWORK RJ-45 port on the XMU+. See "Cable Checklist" in Chapter 1 of the *XMU+ Installation Handbook* for more information about the RJ-45 to RJ-45 cable.
3. Plug the free end of the RJ-45 to RJ-45 cable into the vacant, active network outlet.
4. Ensure the "link" LED is on (green). If it is not on, troubleshoot.

To connect to the PC directly with the Network port

Ethernet (direct) connections require the following:

It is possible to create a non-LAN Ethernet connection by connecting the network port of a PC directly to the network port on the XMU+ with an Ethernet cable. In this case, the data transfer speeds are much faster than direct connection (RS-232). See *Cabling the XMU+ Control Card* on page 47 for more information.

1. Ensure that there is a vacant Network port on the PC.
2. Connect one end of the Ethernet cable to the NETWORK RJ-45 port on the XMU+.
3. Plug the free end of the Ethernet cable into the PC's Network port.
4. Ensure the "link" LED is on (green). If it is not on, troubleshoot.

Connecting Remote Telephone Access (optional)

DTMF

Dual Tone Multi Frequency

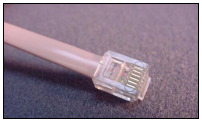
The XMU+ provides a remote telephone access port, which is accessed through the REMOTE RJ-11 connector on the Control card. See *Cabling the XMU+ Control Card* on page 47 for more information.

An analog line is connected (using a standard telephone jack and cable) to the XMU+ to provide Remote Access to the XMU+. Remote Access allows control of the XMU+ from a remote location using a DTMF (touch tone) telephone. Thus an operator who is not in the same room as the XMU+, or who does not have XMUCOM+ installed on their PC, can still create and modify XMU+ messages.

If this Remote Access option is connected, record it in the Delivery Checklist. See *Physical Specifications* on page 21.

To connect an analog line to provide Remote Telephone Access

Remote Access connections require the following:



POTS Line

POTS

Plain Old Telephone Service

1. Ensure that a vacant, active telephone outlet is nearby. If one is not nearby, install one. Prior to working with telephone lines, please refer to the following safety considerations:
   - Never install telephone wiring during a lightning storm.
   - Never install a telephone jack in a wet location unless the jack is specifically designed for wet locations.
   - Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.
   - Always use caution when installing or modifying telephone lines.
2. Connect the one end of the POTS line or analog extension to the RJ-11 remote access port on the XMU+.
3. Plug the RJ-11 Mating Connector (telephone jack) on the opposite end of the POTS line or analog extension into the vacant, active telephone outlet.
4. Configure the XMU+ to allow Remote Access. See *Understanding XMU+ Remote Telephone Access* on page 85.

Connecting Alarms (optional)

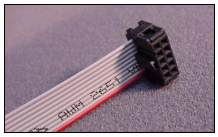
The XMU+ provides two output alarm contacts and two input alarm contacts, all of which are accessed through the contact pinout on the Control card.

This alarm contact...	Is used to...	For more information...
Output 1	Trigger an external device (a light or a buzzer) in the event of a system failure, such as input power loss or microprocessor failure.	See *To wire the alarm connector* on page 53 for more information).
Output 2	Trigger an external device or monitor in the event that one of the two power supplies fails (this feature only on an XMU+ large chassis unit with a dual power supply).	See *To wire the alarm connector* on page 53 for more information).
Input 1	Connect the optional override switch feature. When connected to the XMU+, the override switch allows regular programming to be overridden by a pre-recorded message in case of an emergency.	See the XMUCOM+ application to program override messages.
Input 2	Reserved for future use.	Information not yet available for this future feature.

Record the alarm option chosen (connector or override switch) in *The XMU+ Delivery Checklist* on page 21.

To wire the alarm connector

Alarm connections require the following:



Alarm Mating Connector

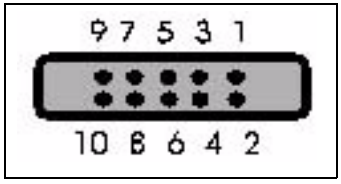
When the system is powered up and running normally, there is a closed circuit between the Common (C) and the Normally Closed (NC) contacts, and an open circuit between the Common (C) and the Normally Open (NO) contacts. In an alarm condition, the opposite occurs, with an open circuit between the (C) and the (NC) contacts, and a closed circuit between the (C) and the (NO) contacts.

1. Wire the connector pinouts on the alarm connector using the following table.

Pin...	Used for...	Pin...	Used for...
1	Alarm 1 Output (NC).	6	Alarm 1 Input.
2	Alarm 1 Output (NO).	7	Alarm 2 Output (NC).
3	Alarm 1 Output (C).	8	Alarm 2 Output (NO).
4	Alarm 2 Input.	9	Alarm 2 Output (C).
5	Alarm 1 Input.	10	Alarm 2 Input.

2. Connect the wires to the appropriate external device, such as a light or a buzzer.
3. Plug the alarm mating connector into the ALARM port on the XMU+ control card.

Alarm pin out on the XMU+ Control Card



Cabling XMU+ Line Cards

The diverse applications that the XMU+ can execute is made possible by the various line cards that can be installed. Each line card must be cabled individually to the PBX, transmitter, or amplifier. This section describes the procedures for cabling XMU+ line cards.

To cable Hybrid Analog line cards

Hybrid Analog line cards give the XMU+ the ability to provide Auto-Attendant/ Audiotex announcements, 1-800 ACD call routing, and ACD/UCD intercept messages. Hybrid Analog line cards replace the Passive and Interactive Line Cards by combining their features. Cable the Hybrid Analog line card using the steps shown below.

1. Verify that PBX line cards are configured for the appropriate XMU+ application (Call Processing, Auto Attendant, or ACD). See *About XMU+ Operating Modes* on page 68 for more information.
2. Punch down wires from PBX to the punch block.
3. Punch down wires from XMU+ to the punch block.
4. Cross connect the wires in the punch block as per the following PBX tables:
   - *Call Processing/Auto Attendant Applications* on page 56. This table is also used to cable Interactive line cards in older XMU units.
   - *ACD Applications* on page 57. These tables are also used to cable Passive line cards in older XMU units.

To cable Low Impedance cards

Low Impedance XMU+ line cards are used to provide ACD/UCD messages. However, Low Impedance cards can connect one (1) passive port to twenty-four (24) PBX trunks. Low Impedance line cards can only be used with Nortel PBXs.

1. Verify that PBX line cards are configured for the appropriate ACD application. See *About XMU+ Operating Modes* on page 68 for more information.
2. Punch down wires from PBX to punch block.
3. Punch down wires from XMU+ to punch block.
4. Cross connect the wires in the punch block as per the appropriate (Nortel only) *ACD Applications* table on page 64.

To cable T1 line cards

T1 XMU+ line cards connect to a T1 communication link on a PBX to provide the XMU+ with 24 T1 user channels.

1. Verify that PBX line cards are configured for the T1 application.
   See *About XMU+ Operating Modes* on page 68 for more information.
2. Verify that the T1 hardware settings are correct.
   See Chapter 3 of the *XMU+ Installation Handbook*.
3. Use a CAT5 cable to connect the RJ-45 port on the T1 line card directly to the communication link on the PBX.

To cable MOH line cards

MOH line cards combine music (from an external or internal source) and messages to create an "On Hold" environment for the XMU+.

1. Verify that PBX line cards are configured for the MOH application.
   See *About XMU+ Operating Modes* on page 68 for more information.
2. Verify that the MOH hardware settings are correct.
   See *Applying MOH Line Card Settings* on page 31.
3. Verify that PBX line cards are correct.
4. Punch down wires from PBX to punch block.
5. Punch down wires from XMU+ to punch block.
6. Cross connect the wires in the punch block as per the *MOH Applications* table on page 66.

To cable MWR line cards

MWR line cards provide XMU+ with the ability to broadcast weather information for Environment Canada.

1. Wire the XMU+ outputs to the transmitter inputs as per the *MWR Applications* table on page 67.
2. If required, key the transmitter as per the *MWR Applications* table on page 67.
3. Repeat steps 1 and 2 until all transmitters are cabled.

Common Interface Tables (By Application)

The following tables describe the PBX, announcer, and transmitter interfaces for each XMU+ application.

- *Call Processing/Auto Attendant Applications* on page 56.
- *ACD Applications* on page 57.
- *MOH Applications* on page 66.
- *MWR Applications* on page 67.

There are no tables for T1 line cards as it is not PBX dependent.

Call Processing/Auto Attendant Applications

This table describes the cabling of Hybrid Analog line cards (Ring Start) to the following PBXs:

- Public Telephone Network
- PBX Analog Station Port.
- Analog Centrex Line.

See *To cable Hybrid Analog line cards* on page 54 for more information.

PABX Signal	Announcer Signal	Line 1 Pin-Color	Line 2 Pin-Color	Line 3 Pin-Color	Line 4 Pin-Color	Line 5 Pin-Color	Line 6 Pin-Color	Line 7 Pin-Color	Line 8 Pin-Color
Ring	Ring	1 - Blu/Wht	4 - Brn/Wht	7 - Org/Red	10 - Slt/Red	13 - Grn/Blk	16 - Blu/Yel	19 - Brn/Yel	22 - Org/Vlt
Tip	Tip	26 - Wht/Blu	29 - Wht/Brn	32 - Red/Org	35 - Red/Slt	38 - Blk/Grn	41 - Yel/Blu	44 - Yel/Brn	47 - Vlt/Org
PBX Operation Mode: Ring Start (R). See *About XMU+ Operating Modes* on page 68 for more information.									

ACD Applications

The XMU+ can be coupled with a variety of PBXs to provide ACD announcements. The following tables describe the cabling of Hybrid Analog line cards to these PBXs:

- *GPT iSDX and Realitis; Siemens 9005-9006, HiPath 3000, HiPath 4000; Intecom; ITT 3100; HICOM 300 Series; Mitel SX50, SX200, SX2000, 3300; Toshiba Perception Rolm 9751, CBX 8000, CBX 9000; TadarianCoral.* on page 58.
- *AT&T Dimension 2000* on page 58.
- *AT&T G2, G3, and Definity (option 1)* on page 59.
- *AT&T G2, G3, and Definity (option 2)* on page 59.
- *AT&T System 75/85* on page 60.
- *Ericsson MD 110* on page 60.
- *Harris 20/20 LH and 20/20 M* on page 61.
- *Hitachi EDX, MDX, and LDX* on page 61.
- *Hitachi HCX-5000* on page 62.
- *Microtel GTD-5* on page 62.
- *Microtel Omni* on page 63.
- *NEC NEAX2400* on page 63.
- *Nortel SL-1®or Meridian-1® (option 1), DMS-100, SL-100, CS1000 and Centrex* on page 64.
- *Northern Telecom SL-1®or Meridian-1® (option 2)* on page 64.
- *ROLM 9200* on page 65.
- *Siemens Saturn* on page 65.
- *Solid State Junior and Senior Executive* on page 66.

See *To cable Hybrid Analog line cards* on page 54 for more information.

GPT iSDX and Realitis; Siemens 9005-9006, HiPath 3000, HiPath 4000; Intecom; ITT 3100; HICOM 300 Series; Mitel SX50, SX200, SX2000, 3300; Toshiba Perception Rolm 9751, CBX 8000, CBX 9000; TadarianCoral.

PABX Signal	Announcer Signal	Line 1 Pin-Color	Line 2 Pin-Color	Line 3 Pin-Color	Line 4 Pin-Color	Line 5 Pin-Color	Line 6 Pin-Color	Line 7 Pin-Color	Line 8 Pin-Color
Ring	Ring	1 - Blu/Wht	4 - Brn/Wht	7- Org/Red	10 - Slt/Red	13 - Grn/Blk	16 - Blu/Yel	19 - Brn/Yel	22 - Org/Vlt
Tip	Tip	26- Wht/Blu	29 -Wht/Brn	32 Red/Org	35 - Red/Slt	38 - Blk/Grn	41 - Yel/Blu	44 - Yel/Brn	47 - Vlt/Org

PBX Operation Mode: Ring Start (R). See *About XMU+ Operating Modes* on page 68 for more information.

GPT iSDX and Realitis use the 1HAC 50049 ADB card to interface.

AT&T Dimension 2000

PABX Signal	Announcer Signal	Line 1 Pin-Color	Line 2 Pin-Color	Line 3 Pin-Color	Line 4 Pin-Color	Line 5 Pin-Color	Line 6 Pin-Color	Line 7 Pin-Color	Line 8 Pin-Color
Ring	Ring	1 - Blu/Wht	4 - Brn/Wht	7 - Org/Red	10 - Slt/Red	13 - Grn/Blk	16 - Blu/Yel	19 - Brn/Yel	22 - Org/Vlt
Tip	Tip	26 - Wht/Blu	29 - Wht/Brn	32 - Red/Org	35 - Red/Slt	38 - Blk/Grn	41 - Yel/Blu	44 - Yel/Brn	47 - Vlt/Org
Battery *	Start-	28 - Wht/Grn	31 - Red/Blu	34 - Red/Brn	37 - Blk/Org	40 - Blk/Slt	43 - Yel/Grn	46 - Vlt/Blu	49 - Vlt/Brn
S2	Start+	3 - Grn/Wht	6 - Blu/Red	9 - Brn/Red	12 - Org/Blk	15 - Slt/Blk	18 - Grn/Yel	21 - Blu/Vlt	24 - Brn/Vlt
AL1	CP1	27 - Wht/Org	30 - Wht/Slt	33 - Red/Grn	36 - Blk/Blu	39 - Blk/Brn	42 - Yel/Org	45 - Yel/Slt	48 - Vlt/Grn
Battery *	CP2	2 - Org/Wht	5 - Slt/Wht	8 - Grn/Red	11 - Blu/Blk	14 - Brn/Blk	17 - Org/Yel	20 - Slt/Yel	23 - Grn/Vlt

PBX Operation Mode: Pulse Start/Level Return (PS/LR NC). See *About XMU+ Operating Modes* on page 68 for more information.

Set the switches on the LC 13 circuit pack as follows:

Circuit 0	Circuit 1
Switch 4 - Open	Switch 1 - Open
Switch 5 - Closed	Switch 2 - Closed
Switch 6 - Open	Switch 3 - Open

Connect announcer to Dimension 2000 LC13 Circuit Pack, Recorded Announcement Interface.

AT&T G2, G3, and Definity (option 1)

PABX Signal	Announcer Signal	Line 1 Pin-Color	Line 2 Pin-Color	Line 3 Pin-Color	Line 4 Pin-Color	Line 5 Pin-Color	Line 6 Pin-Color	Line 7 Pin-Color	Line 8 Pin-Color
Ring	Ring	1 - Blu/Wht	4 - Brn/Wht	7 - Org/Red	10 - Slt/Red	13 - Grn/Blk	16 - Blu/Yel	19 - Brn/Yel	22 - Org/Vlt
Tip	Tip	26 - Wht/Blu	29 - Wht/Brn	32 - Red/Org	35 - Red/Slt	38 - Blk/Grn	41 - Yel/Blu	44 - Yel/Brn	47 - Vlt/Org
Battery*	Start-	28 - Wht/Grn	31 - Red/Blu	34- Red/Brn	37 - Blk/Org	40 - Blk/Slt	43 - Yel/Grn	46 - Vlt/Blu	49 - Vlt/Brn
S	Start+	3 - Grn/Wht	6 - Blu/Red	9 - Brn/Red	12 - Org/Blk	15 - Slt/Blk	18 - Grn/Yel	21 - Blu/Vlt	24 - Brn/Vlt
AL1	CP1	27 - Wht/Org	30 - Wht/Slt	33 - Red/Grn	36 - Blk/Blu	39 - Blk/Brn	42 - Yel/Org	45 - Yel/Slt	48 - Vlt/Grn
Ground	CP2	2 - Org/Wht	5 - Slt/Wht	8 - Grn/Red	11 - Blu/Blk	14 - Brn/Blk	17 - Org/Yel	20 - Slt/Yel	23 - Grn/Vlt

PBX Operation Mode: Pulse Start/Level Return (PS/LR NO). See *About XMU+ Operating Modes* on page 68 for more information.

Configuration is using a SN 231 card. Ground must come from Circuit Pack.

AT&T G2, G3, and Definity (option 2)

PABX Signal	Announcer Signal	Line 1 Pin-Color	Line 2 Pin-Color	Line 3 Pin-Color	Line 4 Pin-Color	Line 5 Pin-Color	Line 6 Pin-Color	Line 7 Pin-Color	Line 8 Pin-Color
Ring	Ring	1 - Blu/Wht	4 - Brn/Wht	7 - Org/Red	10 - Slt/Red	13 - Grn/Blk	16 - Blu/Yel	19 - Brn/Yel	22 - Org/Vlt
Tip	Tip	26 - Wht/Blu	29 - Wht/Brn	32 - Red/Org	35 - Red/Slt	38 - Blk/Grn	41 - Yel/Blu	44 - Yel/Brn	47 - Vlt/Org
Battery*	Start-	28 - Wht/Grn	31 - Red/Blu	34- Red/Brn	37 - Blk/Org	40 - Blk/Slt	43 - Yel/Grn	46 - Vlt/Blu	49 - Vlt/Brn
SZ1	Start+	3 - Grn/Wht	6 - Blu/Red	9 - Brn/Red	12 - Org/Blk	15 - Slt/Blk	18 - Grn/Yel	21 - Blu/Vlt	24 - Brn/Vlt
S1	CP1	27 - Wht/Org	30 - Wht/Slt	33 - Red/Grn	36 - Blk/Blu	39 - Blk/Brn	42 - Yel/Org	45 - Yel/Slt	48 - Vlt/Grn
S	CP2	2 - Org/Wht	5 - Slt/Wht	8 - Grn/Red	11 - Blu/Blk	14 - Brn/Blk	17 - Org/Yel	20 - Slt/Yel	23 - Grn/Vlt

PBX Operation Mode: Level Start/Pulse Return (LS/PR NO). See *About XMU+ Operating Modes* on page 68 for more information.

Configuration is using a TN 763C card. Ground must come from Circuit Pack, Strap the SZ lead to ground

AT&T System 75/85

PABX Signal	Announcer Signal	Line 1 Pin-Color	Line 2 Pin-Color	Line 3 Pin-Color	Line 4 Pin-Color	Line 5 Pin-Color	Line 6 Pin-Color	Line 7 Pin-Color	Line 8 Pin-Color
Ring	Ring	1 - Blu/Wht	4 - Brn/Wht	7 - Org/Red	10 - Slt/Red	13 - Grn/Blk	16 - Blu/Yel	19 - Brn/Yel	22 - Org/Vlt
Tip	Tip	26 - Wht/Blu	29 - Wht/Brn	32 - Red/Org	35 - Red/Slt	38 - Blk/Grn	41 - Yel/Blu	44 - Yel/Brn	47 - Vlt/Org
Battery*	Start-	28 - Wht/Grn	31 - Red/Blu	34- Red/Brn	37 - Blk/Org	40 - Blk/Slt	43 - Yel/Grn	46 - Vlt/Blu	49 - Vlt/Brn
S	Start+	3 - Grn/Wht	6 - Blu/Red	9 - Brn/Red	12 - Org/Blk	15 - Slt/Blk	18 - Grn/Yel	21 - Blu/Vlt	24 - Brn/Vlt
AL1	CP1	27 - Wht/Org	30 - Wht/Slt	33 - Red/Grn	36 - Blk/Blu	39 - Blk/Brn	42 - Yel/Org	45 - Yel/Slt	48 - Vlt/Grn
Ground	CP2	2 - Org/Wht	5 - Slt/Wht	8 - Grn/Red	11 - Blu/Blk	14 - Brn/Blk	17 - Org/Yel	20 - Slt/Yel	23 - Grn/Vlt

PBX Operation Mode: Pulse Start/Level Return (PS/LR NO). See *About XMU+ Operating Modes* on page 68 for more information.

Ground must come from Circuit Pack.

Ericsson MD 110

PABX Signal	Announcer Signal	Line 1 Pin-Color	Line 2 Pin-Color	Line 3 Pin-Color	Line 4 Pin-Color	Line 5 Pin-Color	Line 6 Pin-Color	Line 7 Pin-Color	Line 8 Pin-Color
T Rec	Ring	1 - Blu/Wht	4 - Brn/Wht	7 - Org/Red	10 - Slt/Red	13 - Grn/Blk	16 - Blu/Yel	19 - Brn/Yel	22 - Org/Vlt
R Tx	Tip	26 - Wht/Blu	29 - Wht/ Brn	32 - Red/Org	35 - Red/Slt	38 - Blk/Grn	41 - Yel/Blu	44 - Yel/Brn	47 - Vlt/Org
M	Start-	28 - Wht/Grn	31 - Red/Blu	34 - Red/Brn	37 - Blk/Org	40 - Blk/Slt	43 - Yel/Grn	46 - Vlt/Blu	49 - Vlt/Brn
Aux. GND	Start+	3 - Grn/Wht	6 - Blu/Red	9 - Brn/Red	12 - Org/Blk	15 - Slt/Blk	18 - Grn/Yel	21 - Blu/Vlt	24 - Brn/Vlt
S -GND	CP1	27 - Wht/Org	30 - Wht/Slt	33 - Red/Grn	36 - Blk/Blu	39 - Blk/Brn	42 - Yel/Org	45 - Yel/Slt	48 - Vlt/Grn
E	CP2	2 - Org/Wht	5 - Slt/Wht	8 - Grn/Red	11 - Blu/Blk	14 - Brn/Blk	17 - Org/Yel	20 - Slt/Yel	23 - Grn/Vlt

PBX Operation Mode: Pulse Start/Level Return Single Play (PS/LR SP NO). See *About XMU+ Operating Modes* on page 68 for more information.

MD 110 is set to type II 2 wire. Var=00, Type=RA1

Connect S - Batt from PABX to Aux - Batt

Harris 20/20 LH and 20/20 M

PABX Signal	Announcer Signal	Line 1 Pin-Color	Line 2 Pin-Color	Line 3 Pin-Color	Line 4 Pin-Color	Line 5 Pin-Color	Line 6 Pin-Color	Line 7 Pin-Color	Line 8 Pin-Color
Ring	Ring	1 - Blu/Wht	4 - Brn/Wht	7 - Org/Red	10 - Slt/Red	13 - Grn/Blk	16 - Blu/Yel	19 - Brn/Yel	22 - Org/Vlt
Tip	Tip	26 - Wht/Blu	29 - Wht/Brn	32 - Red/Org	35 - Red/Slt	38 - Blk/Grn	41 - Yel/Blu	44 - Yel/Brn	47 - Vlt/Org
M	Start-	28 - Wht/Grn	31 - Red/Blu	34 - Red/Brn	37 - Blk/Org	40 - Blk/Slt	43 - Yel/Grn	46 - Vlt/Blu	49 - Vlt/Brn
Ground*	Start+	3 - Grn/Wht	6 - Blu/Red	9 - Brn/Red	12 - Org/Blk	15 - Slt/Blk	18 - Grn/Yel	21 - Blu/Vlt	24 - Brn/Vlt
E	CP1	27 - Wht/Org	30 - Wht/Slt	33 - Red/Grn	36 - Blk/Blu	39 - Blk/Brn	42 - Yel/Org	45 - Yel/Slt	48 - Vlt/Grn
Ground*	CP2	2 - Org/Wht	5 - Slt/Wht	8 - Grn/Red	11 - Blu/Blk	14 - Brn/Blk	17 - Org/Yel	20 - Slt/Yel	23 - Grn/Vlt

PBX Operation Mode: Level Start/Pulse Return Single Play (LS/PR SP NO). See *About XMU+ Operating Modes* on page 68 for more information.

Connect announcer to a 2 wire or 4-wire E&M Trunk Card.

Configure E&M Trunk Card for Type I E&M signaling.

Hitachi EDX, MDX, and LDX

PABX Signal	Announcer Signal	Line 1 Pin-Color	Line 2 Pin-Color	Line 3 Pin-Color	Line 4 Pin-Color	Line 5 Pin-Color	Line 6 Pin-Color	Line 7 Pin-Color	Line 8 Pin-Color
Ring	Ring	1 - Blu/Wht	4 - Brn/Wht	7 - Org/Red	10 - Slt/Red	13 - Grn/Blk	16 - Blu/Yel	19 - Brn/Yel	22 - Org/Vlt
Tip	Tip	26 - Wht/Blu	29 - Wht/Brn	32 - Red/Org	35 - Red/Slt	38 - Blk/Grn	41 - Yel/Blu	44 - Yel/Brn	47 - Vlt/Org
Battery*	Start-	28 - Wht/Grn	31 - Red/Blu	34 - Red/Brn	37 - Blk/Org	40 - Blk/Slt	43 - Yel/Grn	46 - Vlt/Blu	49 - Vlt/Brn
SSLO	Start+	3 - Grn/Wht	6 - Blu/Red	9 - Brn/Red	12 - Org/Blk	15 - Slt/Blk	18 - Grn/Yel	21 - Blu/Vlt	24 - Brn/Vlt

PBX Operation Mode: Level Start/Pulse Return Single Play (LS/PR SP NO). See *About XMU+ Operating Modes* on page 68 for more information.

Connect announcer to Hitachi card number 4SRBWT. Connect SS0 lead to system ground.

Hitachi HCX-5000

PABX Signal	Announcer Signal	Line 1 Pin-Color	Line 2 Pin-Color	Line 3 Pin-Color	Line 4 Pin-Color	Line 5 Pin-Color	Line 6 Pin-Color	Line 7 Pin-Color	Line 8 Pin-Color
Ring	Ring	1 - Blu/Wht	4 - Brn/Wht	7 - Org/Red	10 - Slt/Red	13 - Grn/Blk	16 - Blu/Yel	19 - Brn/Yel	22 - Org/Vlt
Tip	Tip	26 - Wht/Blu	29 - Wht/Brn	32 - Red/Org	35 - Red/Slt	38 - Blk/Grn	41 - Yel/Blu	44 - Yel/Brn	47 - Vlt/Org
M	Start-	28 - Wht/Grn	31 - Red/Blu	34 - Red/Brn	37 - Blk/Org	40 - Blk/Slt	43 - Yel/Grn	46 - Vlt/Blu	49 - Vlt/Brn
SG	Start+	3 - Grn/Wht	6 - Blu/Red	9 - Brn/Red	12 - Org/Blk	15 - Slt/Blk	18 - Grn/Yel	21 - Blu/Vlt	24 - Brn/Vlt
E	CP1	27 - Wht/Org	30 - Wht/Slt	33 - Red/Grn	36 - Blk/Blu	39 - Blk/Brn	42 - Yel/Org	45 - Yel/Slt	48 - Vlt/Grn
SG	CP2	2 - Org/Wht	5 - Slt/Wht	8 - Grn/Red	11 - Blu/Blk	14 - Brn/Blk	17 - Org/Yel	20 - Slt/Yel	23 - Grn/Vlt

PBX Operation Mode: Level Start/Pulse Return Single Play (LS/PR SP NO). See *About XMU+ Operating Modes* on page 68 for more information.

Set the strapping on the 4 ANIF card as follows: TM00 1-2 TM02 3-4 TM01 1-2 TM03 1-2

HCX Programming: System Features Screen 2.1.2.1 (Specify one or two announcements played to caller. This affects announcements system wide).
Announcement Trunk Group Set Up Screen 2.1.5.1 (Trunk Type=OGT, Connection Class=TKTH).

Microtel GTD-5

PABX Signal	Announcer Signal	Line 1 Pin-Color	Line 2 Pin-Color	Line 3 Pin-Color	Line 4 Pin-Color	Line 5 Pin-Color	Line 6 Pin-Color	Line 7 Pin-Color	Line 8 Pin-Color
Ring	Ring	1 - Blu/Wht	4 - Brn/Wht	7 - Org/Red	10 - Slt/Red	13 - Grn/Blk	16 - Blu/Yel	19 - Brn/Yel	22 - Org/Vlt
Tip	Tip	26 - Wht/Blu	29 - Wht/Brn	32 - Red/Org	35 - Red/Slt	38 - Blk/Grn	41 - Yel/Blu	44 - Yel/Brn	47 - Vlt/Org
Battery*	Start-	28 - Wht/Grn	31 - Red/Blu	34 - Red/Brn	37 - Blk/Org	40 - Blk/Slt	43 - Yel/Grn	46 - Vlt/Blu	49 - Vlt/Brn
C	Start+	3 - Grn/Wht	6 - Blu/Red	9 - Brn/Red	12 - Org/Blk	15 - Slt/Blk	18 - Grn/Yel	21 - Blu/Vlt	24 - Brn/Vlt
SSG	CP1	27 - Wht/Org	30 - Wht/Slt	33 - Red/Grn	36 - Blk/Blu	39 - Blk/Brn	42 - Yel/Org	45 - Yel/Slt	48 - Vlt/Grn
E	CP2	2 - Org/Wht	5 - Slt/Wht	8 - Grn/Red	11 - Blu/Blk	14 - Brn/Blk	17 - Org/Yel	20 - Slt/Yel	23 - Grn/Vlt

PBX Operation Mode: Pulse Start/Level Return Multiple Play (PS/LR MP NO). See *About XMU+ Operating Modes* on page 68 for more information.

Connect SSG lead to system ground.

Microtel Omni

PABX Signal	Announcer Signal	Line 1 Pin-Color	Line 2 Pin-Color	Line 3 Pin-Color	Line 4 Pin-Color	Line 5 Pin-Color	Line 6 Pin-Color	Line 7 Pin-Color	Line 8 Pin-Color
Ring	Ring	1 - Blu/Wht	4 - Brn/Wht	7 - Org/Red	10 - Slt/Red	13 - Grn/Blk	16 - Blu/Yel	19 - Brn/Yel	22 - Org/Vlt
Tip	Tip	26 - Wht/Blu	29 - Wht/Brn	32 - Red/Org	35 - Red/Slt	38 - Blk/Grn	41 - Yel/Blu	44 - Yel/Brn	47 - Vlt/Org
M	Start-	28 - Wht/Grn	31 - Red/Blu	34 - Red/Brn	37 - Blk/Org	40 - Blk/Slt	43 - Yel/Grn	46 - Vlt/Blu	49 - Vlt/Brn
Ground*	Start+	3 - Grn/Wht	6 - Blu/Red	9 - Brn/Red	12 - Org/Blk	15 - Slt/Blk	18 - Grn/Yel	21 - Blu/Vlt	24 - Brn/Vlt
E	CP1	27 - Wht/Org	30 - Wht/Slt	33 - Red/Grn	36 - Blk/Blu	39 - Blk/Brn	42 - Yel/Org	45 - Yel/Slt	48 - Vlt/Grn
Ground*	CP2	2 - Org/Wht	5 - Slt/Wht	8 - Grn/Red	11 - Blu/Blk	14 - Brn/Blk	17 - Org/Yel	20 - Slt/Yel	23 - Grn/Vlt

PBX Operation Mode: Pulse Start/Level Return (PS/LR NO). See *About XMU+ Operating Modes* on page 68 for more information.

NEC NEAX2400

PABX Signal	Announcer Signal	Line 1 Pin-Color	Line 2 Pin-Color	Line 3 Pin-Color	Line 4 Pin-Color	Line 5 Pin-Color	Line 6 Pin-Color	Line 7 Pin-Color	Line 8 Pin-Color
Ring	Ring	1 - Blu/Wht	4 - Brn/Wht	7 - Org/Red	10 - Slt/Red	13 - Grn/Blk	16 - Blu/Yel	19 - Brn/Yel	22 - Org/Vlt
Tip	Tip	26 - Wht/Blu	29 - Wht/Brn	32 - Red/Org	35 - Red/Slt	38 - Blk/Grn	41 - Yel/Blu	44 - Yel/Brn	47 - Vlt/Org
M	Start-	28 - Wht/Grn	31 - Red/Blu	34 - Red/Brn	37 - Blk/Org	40 - Blk/Slt	43 - Yel/Grn	46 - Vlt/Blu	49 - Vlt/Brn
Ground	Start+	3 - Grn/Wht	6 - Blu/Red	9 - Brn/Red	12 - Org/Blk	15 - Slt/Blk	18 - Grn/Yel	21 - Blu/Vlt	24 - Brn/Vlt

PBX Operation Mode: Level Start/Pulse Return Single Play (LS/PR SP NO). See *About XMU+ Operating Modes* on page 68 for more information.

Set the switches on the TLT circuit board as follows:

Switch 00 - EM
Switch 10 - 600Ω
Switch 20 - Ground Idle
Switch 01 - EM
Switch 11 - 600Ω
Switch 21 - Ground Idle
Switch 02 - EM
Switch 12 - 600Ω
Switch 22 - Ground Idle
Switch 03 - EM
Switch 13 - 600Ω
Switch 23 - Ground Idle

Connect announcer to NEC 4TLT - Loop and Tie-Line Interface Circuit Card.

Nortel SL-1®or Meridian-1® (option 1), DMS-100, SL-100, CS1000 and Centrex

The Low Impedance option is required when 4 to 24 RAN trunks are connected in parallel to a single channel.

PABX Signal	Announcer Signal	Line 1 Pin-Color	Line 2 Pin-Color	Line 3 Pin-Color	Line 4 Pin-Color	Line 5 Pin-Color	Line 6 Pin-Color	Line 7 Pin-Color	Line 8 Pin-Color
Ring	Ring	1 - Blu/Wht	4 - Brn/Wht	7 - Org/Red	10 - Slt/Red	13 - Grn/Blk	16 - Blu/Yel	19 - Brn/Yel	22 - Org/Vlt
Tip	Tip	26 - Wht/Blu	29 - Wht/Brn	32 - Red/Org	35 - Red/Slt	38 - Blk/Grn	41 - Yel/Blu	44 - Yel/Brn	47 - Vlt/Org
CP/E	CP1	27 - Wht/Org	30 - Wht/Slt	33 - Red/Grn	36 - Blk/Blu	39 - Blk/Brn	42 - Yel/Org	45 - Yel/Slt	48 - Vlt/Grn
Ground	CP2	2 - Org/ Wht	5 - Slt/Wht	8 - Grn/Red	11 - Blu/Blk	14 - Brn/Blk	17 - Org/Yel	20 - Slt/Yel	23 - Grn/Vlt

PBX Operation Mode: Continuous Play (CP NO). See *About XMU+ Operating Modes* on page 68 for more information.

Meridian-1: Connect announcer to NT8D14 Universal Trunk Card or NT5K19 or NT5K72AA. Configure Meridian-1 for an Audichron Announcer. IMPORTANT: Do not connect MB lead. Software must be downloaded to card by disabling, then re-enabling card

SL-1: Connect announcer to QP C74 Recorded Announcement Circuit Pack. Configure SL-1 for an Audichron Announcer.

DMS: Connect announcer to NT2X72AA Card. Configure DMS for an Audichron Announcer. Connect announcer's Tip and Ring to the NT2X72AA card's Tip 1 and Ring 1.

Northern Telecom SL-1®or Meridian-1® (option 2)

The Low Impedance option is required when 4 to 24 RAN trunks are connected in parallel to a single channel

PABX Signal	Announcer Signal	Line 1 Pin-Color	Line 2 Pin-Color	Line 3 Pin-Color	Line 4 Pin-Color	Line 5 Pin-Color	Line 6 Pin-Color	Line 7 Pin-Color	Line 8 Pin-Color
Ring	Ring	1 - Blu/Wht	4 - Brn/Wht	7 - Org/Red	10 - Slt/Red	13 - Grn/Blk	16 - Blu/Yel	19 - Brn/Yel	22 - Org/Vlt
Tip	Tip	26 - Wht/Blu	29 - Wht/Brn	32 - Red/Org	35 - Red/Slt	38 - Blk/Grn	41 - Yel/Blu	44 - Yel/Brn	47 - Vlt/Org
Battery*	Start-	28 - Wht/Grn	31 - Red/Blu	34 - Red/Brn	37 - Blk/Org	40 - Blk/Slt	43 - Yel/Grn	46 - Vlt/Blu	49 - Vlt/Brn
Start/ MB	Start+	3 - Grn/Wht	6 - Blu/Red	9 - Brn/Red	12 - Org/Blk	15 - Slt/Blk	18 - Grn/Yel	21 - Blu/Vlt	24 - Brn/Vlt
CP	CP1	27 - Wht/Org	30 - Wht/Slt	33 - Red/Grn	36 - Blk/Blu	39 - Blk/Brn	42 - Yel/Org	45 - Yel/Slt	48 - Vlt/Grn
Ground	CP2	2 - Org/Wht	5 - Slt/Wht	8 - Grn/Red	11 - Blu/Blk	14 - Brn/Blk	17 - Org/Yel	20 - Slt/Yel	23 - Grn/Vlt

PBX Operation Mode: Pulse Start/Level Return (PS/LR NO). See *About XMU+ Operating Modes* on page 68 for more information.

Meridian-1: Connect announcer to QPC74 Recorded Announcement Circuit Pack or NT8D14BA (or later) Universal Trunk Card or NT5K19 or NT5K72AA. Software release X19 (or later) must be used when connecting to the Universal Trunk Card.
Configure Meridian-1 for a Cook Electric 201 Announcer. Software must be down be downloaded to card by disabling, then re-enabling card.

PABX Signal	Announcer Signal	Line 1 Pin-Color	Line 2 Pin-Color	Line 3 Pin-Color	Line 4 Pin-Color	Line 5 Pin-Color	Line 6 Pin-Color	Line 7 Pin-Color	Line 8 Pin-Color

SL-1: Connect announcer to QPC74 Recorded Announcement Circuit Pack. Configure SL-1 for a Cook Electric 201 Announcer.

ROLM 9200

PABX Signal	Announcer Signal	Line 1 Pin-Color	Line 2 Pin-Color	Line 3 Pin-Color	Line 4 Pin-Color	Line 5 Pin-Color	Line 6 Pin-Color	Line 7 Pin-Color	Line 8 Pin-Color
Ring	Ring	1 - Blu/Wht	4 - Brn/Wht	7 - Org/Red	10 - Slt/Red	13 - Grn/Blk	16 - Blu/Yel	19 - Brn/Yel	22 - Org/Vlt
Tip	Tip	26 - Wht/Blu	29 - Wht/Brn	32 - Red/Org	35 - Red/Slt	38 - Blk/Grn	41 - Yel/Blu	44 - Yel/Brn	47 - Vlt/Org
M	Start-	28 - Wht/Grn	31 - Red/Blu	34 - Red/Brn	37 - Blk/Org	40 - Blk/Slt	43 - Yel/Grn	46 - Vlt/Blu	49 - Vlt/Brn
SG	Start+	3 - Grn/Wht	6 - Blu/Red	9 - Brn/Red	12 - Org/Blk	15 - Slt/Blk	18 - Grn/Yel	21 - Blu/Vlt	24 - Brn/Vlt
E	CP1	27 - Wht/Org	30 - Wht/Slt	33 - Red/Grn	36 - Blk/Blu	39 - Blk/Brn	42 - Yel/Org	45 - Yel/Slt	48 - Vlt/Grn
Battery	CP2	2 - Org/Wht	5 - Slt/Wht	8 - Grn/Red	11 - Blu/Blk	14 - Brn/Blk	17 - Org/Yel	20 - Slt/Yel	23 - Grn/Vlt

PBX Operation Mode: Level Start/Pulse Return (LS/PR NO). See *About XMU+ Operating Modes* on page 68 for more information.

Strap SB lead to Battery.

Siemens Saturn

PABX Signal	Announcer Signal	Line 1 Pin-Color	Line 2 Pin-Color	Line 3 Pin-Color	Line 4 Pin-Color	Line 5 Pin-Color	Line 6 Pin-Color	Line 7 Pin-Color	Line 8 Pin-Color
Ring	Ring	1 - Blu/Wht	4 - Brn/Wht	7 - Org/Red	10 - Slt/Red	13 - Grn/Blk	16 - Blu/Yel	19 - Brn/Yel	22 - Org/Vlt
Tip	Tip	26 - Wht/Blu	29 - Wht/Brn	32 - Red/Org	35 - Red/Slt	38 - Blk/Grn	41 - Yel/Blu	44 - Yel/Brn	47 - Vlt/Org
Battery*	Start-	28 - Wht/Grn	31 - Red/Blu	34 - Red/Brn	37 - Blk/Org	40 - Blk/Slt	43 - Yel/Grn	46 - Vlt/Blu	49 - Vlt/Brn
EB & MB	Start+	3 - Grn/Wht	6 - Blu/Red	9 - Brn/Red	12 - Org/Blk	15 - Slt/Blk	18 - Grn/Yel	21 - Blu/Vlt	24 - Brn/Vlt
EA	CP1	27 - Wht/Org	30 - Wht/Slt	33 - Red/Grn	36 - Blk/Blu	39 - Blk/Brn	42 - Yel/Org	45 - Yel/Slt	48 - Vlt/Grn
Ground*	CP2	2 - Org/Wht	5 - Slt/Wht	8 - Grn/Red	11 - Blu/Blk	14 - Brn/Blk	17 - Org/Yel	20 - Slt/Yel	23 - Grn/Vlt

PBX Operation Mode: Pulse Start/Level Return (PS/LR NC). See *About XMU+ Operating Modes* on page 68 for more information.

Connect announcer to E&M Trunk Card.

Solid State Junior and Senior Executive

PABX Signal	Announcer Signal	Line 1 Pin-Color	Line 2 Pin-Color	Line 3 Pin-Color	Line 4 Pin-Color	Line 5 Pin-Color	Line 6 Pin-Color	Line 7 Pin-Color	Line 8 Pin-Color
Ring	Ring	1 - Blu/Wht	4 - Brn/Wht	7 - Org/Red	10 - Slt/Red	13 - Grn/Blk	16 - Blu/Yel	19 - Brn/Yel	22 - Org/Vlt
Tip	Tip	26 - Wht/Blu	29 - Wht/Brn	32 - Red/Org	35 - Red/Slt	38 - Blk/Grn	41 - Yel/Blu	44 - Yel/Brn	47 - Vlt/Org
M Sync	CP1	27 - Wht/Org	30 - Wht/Slt	33 - Red/Grn	36 - Blk/Blu	39 - Blk/Brn	42 - Yel/Org	45 - Yel/Slt	48 - Vlt/Grn
Ground	CP2	2 - Org/Wht	5 - Slt/Wht	8 - Grn/Red	11 - Blu/Blk	14 - Brn/Blk	17 - Org/Yel	20 - Slt/Yel	23 - Grn/Vlt

PBX Operation Mode: Synchronized Continuous Play (SCP NC). See *About XMU+ Operating Modes* on page 68 for more information.

MOH Applications

The following table describes the cabling of MOH line cards to a PBX. See *To cable MOH line cards* on page 55 for more information.

PABX Signal	Input 1	Input 2	Output 1	Output 2	Output 3	Output 4
External	grn	grn				
External	red	red				
MOH Input			grn	grn	grn	grn
MOH Input			red	red	red	red

MWR Applications

The following table describes the cabling of MWR line cards to a transmitter. See *To cable MWR line cards* on page 55 for more information.

Transmitter	Announcer Signal	Line 1 Pin-Color	Line 2 Pin-Color	Line 3 Pin-Color	Line 4 Pin-Color	Line 5 Pin-Color	Line 6 Pin-Color	Line 7 Pin-Color	Line 8 Pin-Color
Audio	Ring	1 - Blu/Wht	4 - Brn/Wht	7 - Org/Red	10 - Slt/Red	13 - Grn/Blk	16 - Blu/Yel	19 - Brn/Yel	22 - Org/Vlt
Audio	Tip	26 - Wht/Blu	29 - Wht/Brn	32 - Red/Org	35 - Red/Slt	38 - Blk/Grn	41 - Yel/Blu	44 - Yel/Brn	47 - Vlt/Org
Keying (GND)	CP1	27 - Wht/Org	30 - Wht/Slt	33 - Red/Grn	36 - Blk/Blu	39 - Blk/Brn	42 - Yel/Org	45 - Yel/Slt	48 - Vlt/Grn
Keying (20+ Vdc)	CP2	2 - Org/Wht	5 - Slt/Wht	8 - Grn/Red	11 - Blu/Blk	14 - Brn/Blk	17 - Org/Yel	20 - Slt/Yel	23 - Grn/Vlt

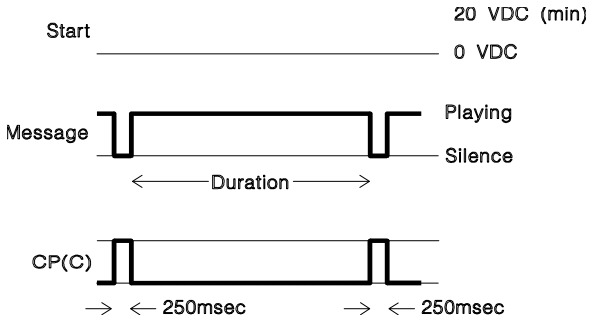
About XMU+ Operating Modes

XMU+ operating modes are PBX dependent. They determine the specific way XMU+ lines behave when communicating with a PBX. See the *XMU+ QuickStart Guide* for more information about operating modes.

If required, determine the appropriate operating mode (listed below) and set the PBX line card to that operating mode. The Control Pulse (CP) relay in the following diagrams can be configured for Normally Open (NO) or Normally Closed (NC) during message play.

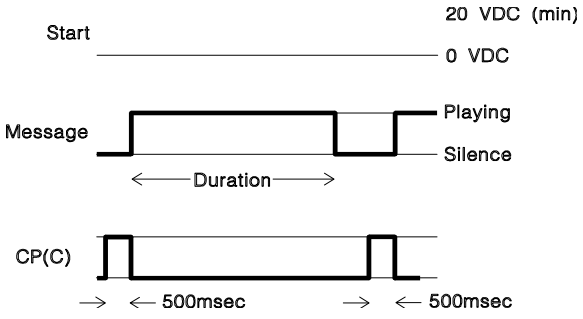
Continuous Play (CP)

The message plays continuously to the line, independent of what is happening on other lines. The CP contacts toggle position for approximately 250 msec. at the start of the message.



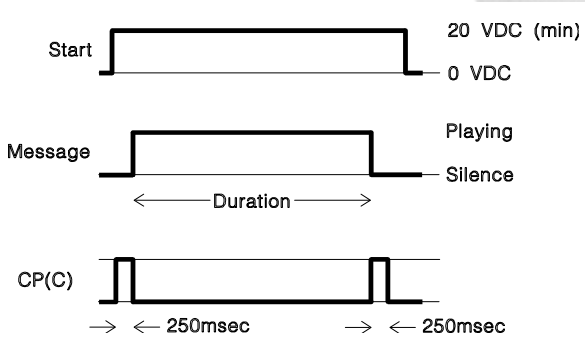
Synchronized Continuous Play (SCP)

The message plays continuously to the line. All lines begin playing the message(s) at the same time. The CP contacts toggle position for approximately 500 msec. at the start of the message(s).



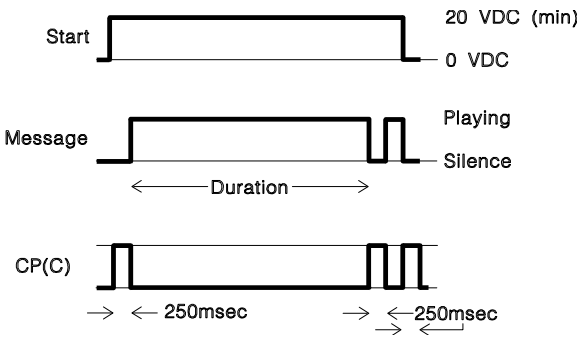
Level Start/Pulse Return - Single Play (LS/PR-SP)

The message plays in response to a start signal. The CP contacts toggle position for approximately 250 msec. at the start and end of the message. The message stops playing if the start signal is removed.



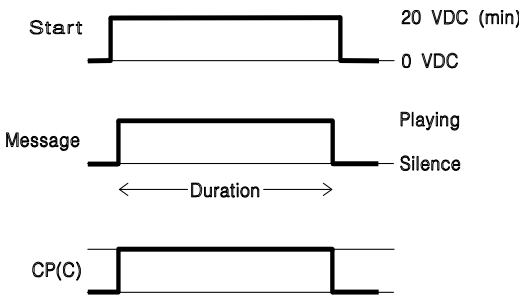
Level Start/Pulse Return - Multiple Play (LS/PR-MP)

The message plays in response to a start signal. The CP contacts toggle position for approximately 250 msec. at the start and end of the message. The message stops playing if the start signal is removed. The message plays repeatedly until the start signal is removed.



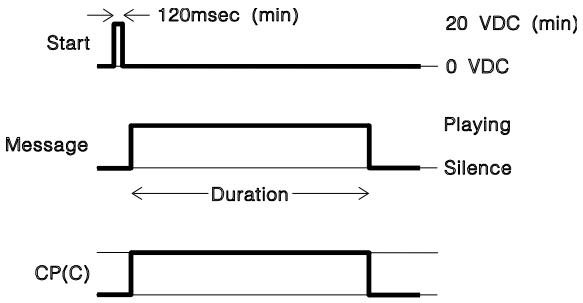
Level Start/Level Return - Single Play (LS/LR-SP)

The message plays in response to a start signal. The CP contacts toggle position while the message is playing. The message stops playing if the start signal is removed.



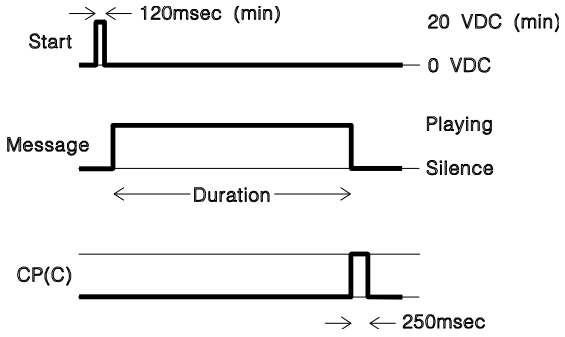
Pulse Start/Level Return (PS/LR)

The message plays in response to a start signal. The CP contacts toggle position while the message is playing.



Pulse Start/Pulse Return (PS/PR)

The message plays in response to a start signal. The CP contacts toggle position for approximately 250 msec. at the end of the message.



Ring Start (R)

The message plays in response to a Loop or Ground Start signal. The message will stop playing, before completion, if loop current is removed from the line.

Ring Start without Loop Current Check (RN)

The message plays in response to a Loop or Ground Start signal. The line will not disconnect until the message has played out completely.

Ring Start/Tone Disconnect (RT)

Will disconnect after 4 sec of continuous tone (RT+ is less sensitive to far-end noise).

Ring Start/DTMF Disconnect (RD)

Will disconnect on A, B, C or D.

Ring Start/Busy Disconnect (RB)

Will disconnect on two cycles of busy tone. (RB+ will disconnect after four cycles of busy tone.)

Ring Start/Quick Answer (RQ)

Line is answered 1/10 second after first ring cycle.

Ring Immediate (RI)

Only available with T1, line is answered after 1/4 second.

7

Understanding XMU+ Navigation

In order to properly test XMU+ installation, you must understand the options XMU+ offers for navigation and configuration, including:

- The XMU+ Front Panel. See *Understanding the XMU+ Front Panel* on page 81.
- XMUCOM+ software. See *XMU+ QuickStart Guide*.
- Remote XMU+ access. See *Understanding XMU+ Remote Telephone Access* on page 85 and *Using Remote Telephone Access* on page 88.

As well, you should gain a brief understanding of the XMU+ firmware hierarchy in order to easily navigate through the XMU+ Front Panel. Firmware is the software that is hard-coded into the XMU+ Control card and the various line cards. See *Understanding the XMU+ Firmware Hierarchy* on page 76.

In this chapter...

- *XMU+ Navigation Activities* on page 75.
- *Understanding the XMU+ Firmware Hierarchy* on page 76.
- *Understanding the XMU+ Front Panel* on page 81.
- *Understanding XMU+ Remote Telephone Access* on page 85.

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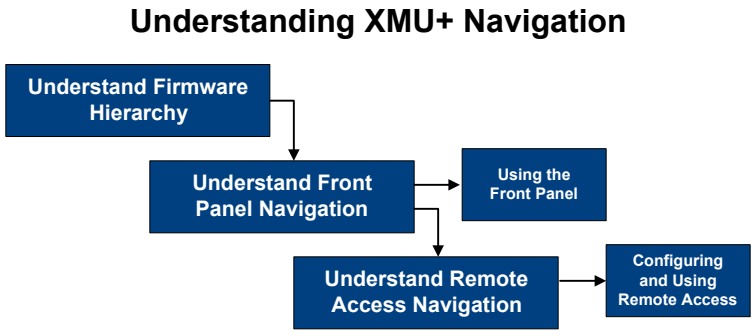
XMU+ Navigation Activities

Complete the following activities to understand XMU+ navigation and to prepare for setting up configurations:



1. Understand the XMU+ hierarchy. See *Understanding the XMU+ Firmware Hierarchy* on page 76 for more information.
2. Understand Front Panel navigation, and learn to configure the XMU+ using the Front Panel. See the following for more information:
   - *Understanding the XMU+ Front Panel* on page 81.
   - *Using the Front Panel* on page 82
3. If required, configure the XMU+ to allow Remote Access and learn to navigate using Remote Access. See the following for more information
   - *Understanding XMU+ Remote Telephone Access* on page 85.
   - *Using Remote Telephone Access* on page 88.

Understanding the XMU+ Firmware Hierarchy

Firmware is the software that is hard-coded into XMU+ control and line cards. You should gain a brief understanding of the XMU+ firmware hierarchy in order to navigate through the XMU+ configuration menu displayed on the Front Panel of the XMU+.

About Partitions

The XMU+ is often set up for a single user (single partition mode), who uses it as a single, large, call processing system. However, when the XMU+ is set up in multiple partition mode in a shared environment, the XMU+ is turned into several virtual systems, with each partition acting as an individual unit. The number of partitions that the XMU+ can be set up for (up to 64) is limited only by the amount of recording time installed.

To determine whether your XMU+ unit is configured for single or multiple partitions, see *To check for system partitioning* on page 84.

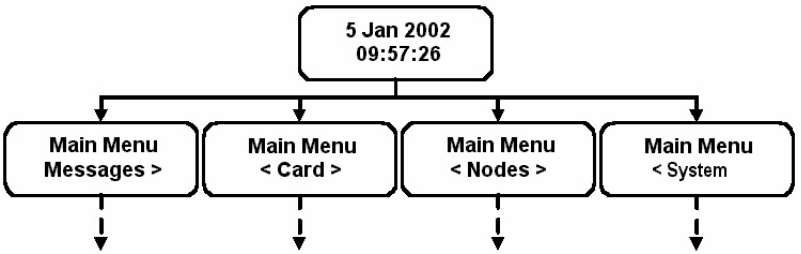
For more information, see:

- *Main Menu Hierarchy - Single Partition Mode* on page 76.
- *Main Menu Hierarchy - Multiple Partition Mode* on page 79.

Main Menu Hierarchy - Single Partition Mode

When the XMU+ is operating in Single Partition mode, the following configuration structure represents the Front Panel Main Menu, from which all configuration commands originate. There are four *Main Menu* categories in the XMU+ firmware:

- Messages - used to record, delete or play messages.
  See *Message Menu Hierarchy - Single Partition Mode* on page 77 for more information.
- Cards - used for card setup and Starting Node.
  See *Card Menu Hierarchy - Single Partition Mode* on page 77 for more information.
- Nodes - used to create the call flow.
  See *Node Menu Hierarchy - Single Partition Mode* on page 78 for more information.
- System - Used to define system parameters, settings and maintenance.
  See *Node Menu Hierarchy - Single Partition Mode* on page 78 for more information.

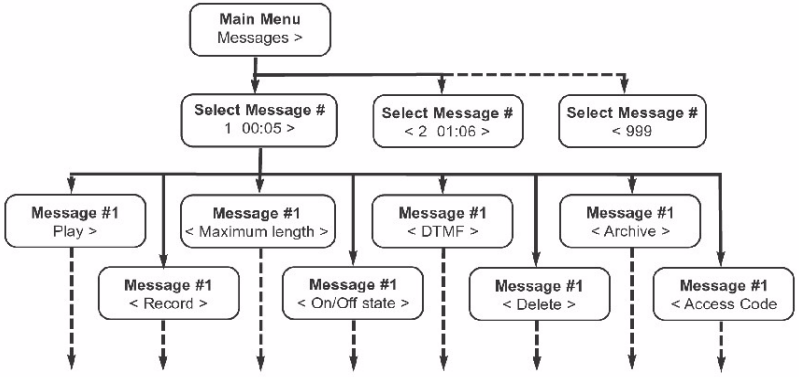


Message Menu Hierarchy - Single Partition Mode

Many XMU+ message capabilities are accessed from the Front Panel. Using the Front Panel, users can:

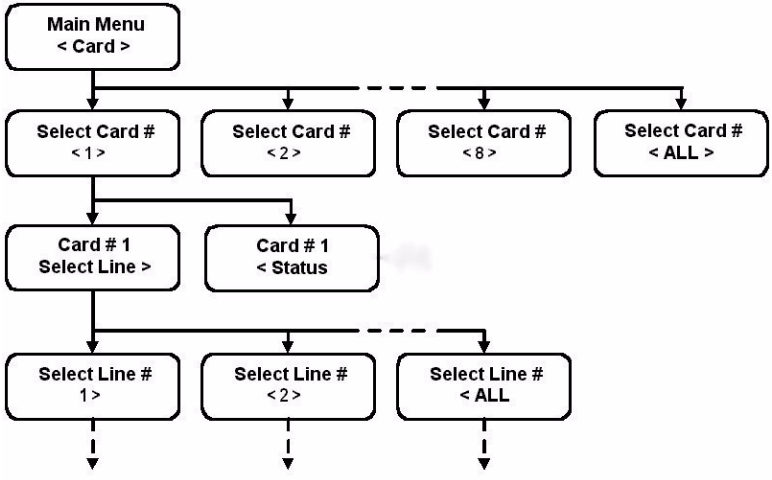
- Play, record and, delete messages.
- View message details.
- Control when and how messages are played.

The following configuration structure represents the Front Panel message menu when XMU+ is operating in Single Partition mode:



Card Menu Hierarchy - Single Partition Mode

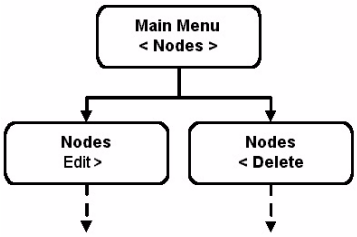
Users can view line card information from the Front Panel by navigating through the card menu hierarchy. The following configuration structure represents the Front Panel card menu when XMU+ is operating in Single Partition mode:



Node Menu Hierarchy - Single Partition Mode

XMU+ configurations control the behavior and functionality of XMU+. Nodes are used to program and define these configuration files. Users can view information about each node by navigating through the node menu hierarchy. See *XMU+ QuickStart Guide* for more information about nodes.

The following configuration structure represents the Front Panel node menu when the XMU+ is operating in Single Partition mode:



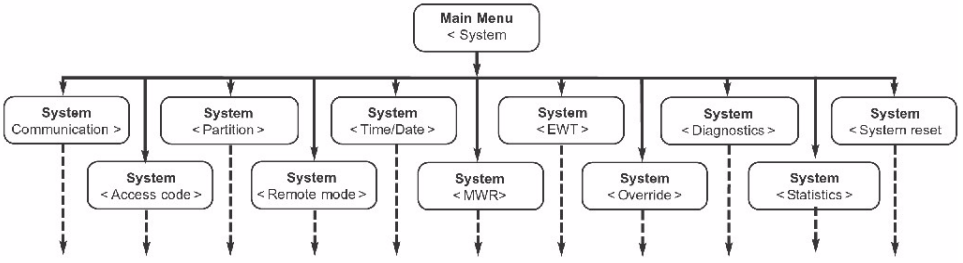
Note: Nodes affected by the **Edit** and **Delete** commands include:

- Command Node >
- < List Node >
- < Time Node >
- < Date Node >
- < DTMF Node >
- < AUTO Node >
- < VOX Node >
- < TABLE Node >
- < MOH Node >
- < PAAS Node >
- < Xfer Node >
- < Xfer Style Node

System Menu Hierarchy - Single Partition Mode

XMU+ system access codes, communication protocols, and system details and status can all be viewed by navigating through the card menu hierarchy on the Front Panel. However, XMUCOM+ also provides an easy-to-use interface for setting, changing, and viewing these parameters. See *XMU+ QuickStart Guide* for more information about system configuration.

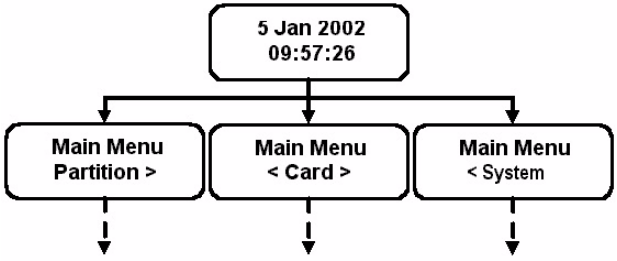
The following configuration structure represents the Front Panel system menu when the XMU+ is operating in Single Partition mode:



Main Menu Hierarchy - Multiple Partition Mode

When the XMU+ is operating in Multiple Partition mode, the following configuration structure represents the Front Panel Main Menu, from which all configuration commands originate. There are three *Main Menu* categories in the XMU+ firmware:

- Cards - used for card setup and Starting Node.
  See *Card Menu Hierarchy - Multiple Partition Mode* on page 79 for more information.
- System - Used to define system parameters, settings and maintenance.
  See *Card Menu Hierarchy - Multiple Partition Mode* on page 79 for more information.
- Partition - Used to create, delete, and modify partition parameters. See *Partition Menu Hierarchy - Multiple Partition Mode* on page 80 for more information.



Note: In the single partition hierarchy, messages and nodes are top-level options. In the multiple partition hierarchy, message and node configuration options are dependent on the partition selected, and are therefore found under the main partition menu.

Card Menu Hierarchy - Multiple Partition Mode

Users can view card information and details from the Front Panel by navigating through the card menu hierarchy. Card is a top-level menu option, since line card options are independent of XMU+ partitions.

The configuration structure of the Front Panel system menu when XMU+ is operating in Multiple Partition mode is exactly the same as the menu displayed in Single Partition mode. See *Card Menu Hierarchy - Single Partition Mode* on page 77 for more information.

System Menu Hierarchy - Multiple Partition Mode

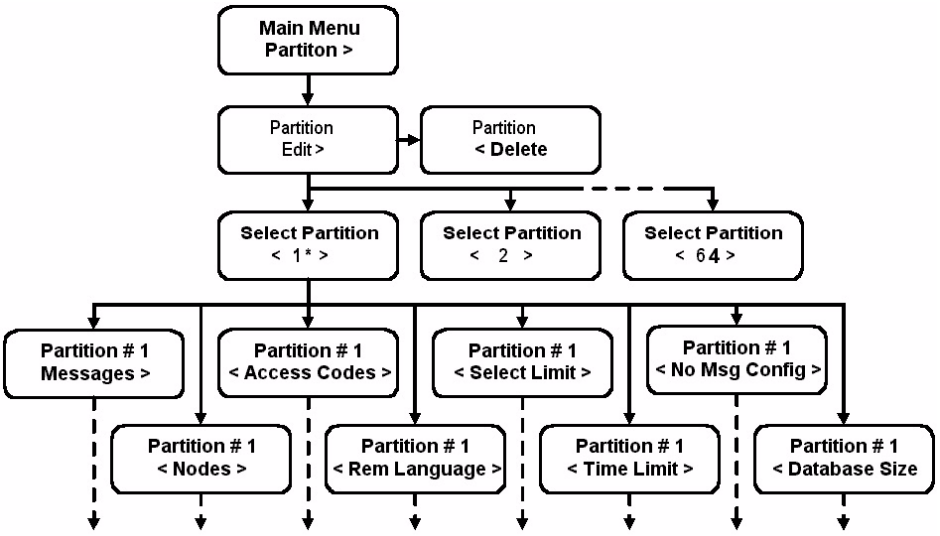
XMU+ system status, details, access codes, and communication protocols can all be viewed by navigating through the system menu hierarchy on the Front Panel.

The configuration structure of the Front Panel system menu when XMU+ is operating in Multiple Partition mode is exactly the same as the menu displayed when XMU+ is operating in Single Partition mode. See *System Menu Hierarchy - Single Partition Mode* on page 78 for more information

Partition Menu Hierarchy - Multiple Partition Mode

Partition parameters, including message and node options, can all be viewed by navigating through the card menu hierarchy on the Front Panel.

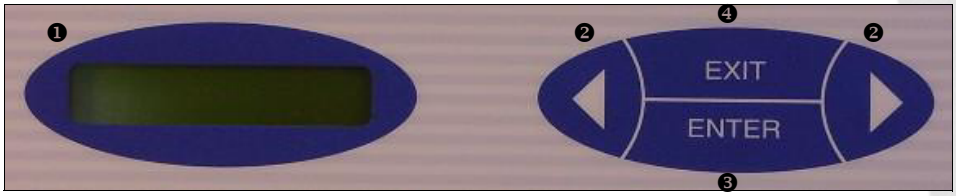
The following configuration structure represents the Front Panel partition menu when the XMU+ is operating in Multiple Partition mode:



Understanding the XMU+ Front Panel

The XMU+ can be configured by using the four buttons and the LCD located on the Front Panel, as shown below.

The Front Panel buttons are used to navigate through the XMU+ configuration menu that is shown on the LCD (display). The menu is arranged in a top-down flow.



This feature...		Is used to...
❶	2 x 16 LCD character display	Display function information and line status to the user.
❷	Arrows	Navigate to the various XMU+ menu options.
❸	Enter	Select a menu option or to navigate to a deeper level of the menu.
❹	Exit	Navigate back up the menu.

Note: XMU+ can also be managed and configured with XMUCOM+ software. This software provides an intuitive, easy-to-use interface for designing and changing XMU+ configurations, and for completing XMU+ administrative functions. See the *XMU+ QuickStart Guide* for more information.

Using the Front Panel

The LCD (display) shows two 16-digit lines. The top line of the display shows the main program category, while the bottom line shows one of the possible selections in that category. An arrow (< or >) on the left or right edge of the display indicates that there is another possible selection in the direction shown.

For example, you are configuring message # 1 if you see the display to the right:

You have the following options in this case:

1. Access additional selections by pressing the right arrow button. There are no selections available by pressing the left arrow button.
2. Select the option that appears on the display (Play) by pressing the **Enter** button.
3. Exit this display by pressing the **Exit** button.

Certain menu items require the selection of a number, for example message index number, as shown in the display to the right:

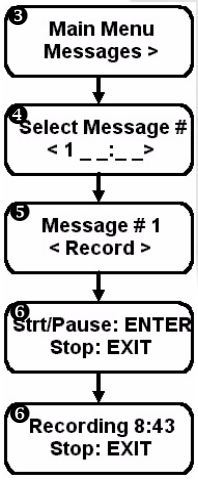
You have the following options in this case:

1. Press the right arrow key to display the next message number.
2. Press the left arrow key to display the previous message number.
3. Press enter to select the current message.

Note: See *Understanding the XMU+ Firmware Hierarchy* on page 76 to view the Front Panel programming tree.

To record a message

1. Connect a handset (included with the XMU+) or tapedeck to the XMU+ unit.
2. Press **Enter** to access the Main Menu.
3. Press **Enter** to select **Messages**.
4. Press the **Right Arrow** button until you reach the desired message number and press **Enter**.
5. Press the **Right Arrow** button until you reach **Record** and press **Enter**.
6. Press **Enter** (again) to begin recording your message. XMU+ monitors your recording time.
7. Press **Exit** to stop recording.
8. Press **Exit** until the menu returns to the main display.

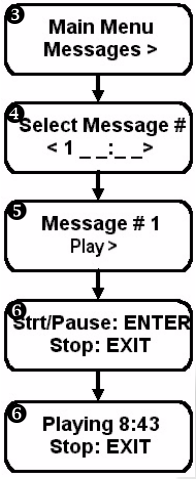


TIP...

To pause while recording, press **Enter**. To resume recording, press **Enter** again.

To play a message

1. Connect a handset (included with the XMU+) to the XMU+ unit.
2. Press **Enter** to access the Main Menu.
3. Press **Enter** to select **Messages**.
4. Press the **Right Arrow** button until you reach the desired message number and press **Enter**.
5. Press **Enter** to select **Play** on the menu.
6. Press **Enter** (again) to play the message. XMU+ plays the message, counting-down the remaining playing time of the message.
7. Press **Exit** to stop playing (or allow the message to play itself out).
8. Press **Exit** until the menu returns to the main display.

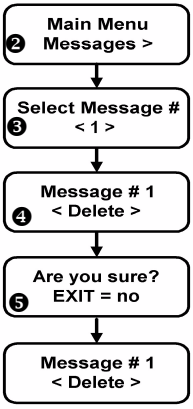


TIP...

To pause while playing, press **Enter**. To resume playing, press **Enter** again.

To delete a message

1. Press **Enter** to access the Main Menu.
2. Press **Enter** to select **Messages**.
3. Press the **Right Arrow** button until you reach the desired message number and press **Enter**.
4. Press the **Right Arrow** button until you reach **Delete** and press **Enter**.
   XMU+ displays a message asking if you are sure that you want to delete this message.
5. Press **Enter** to delete the message.
6. When XMU+ re-displays *Message # <Delete>*, press **Exit** until the menu returns to the main display.



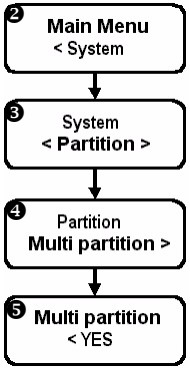
TIP...

To cancel the delete command and return to the previous menu, press **Exit** when XMU+ asks *Are you sure?*.

To check for system partitioning

All XMU+ units have a partitioning option. Multi-partitioning enables the XMU+ to function as multiple units. It is a good idea to determine whether or not multi-partitioning is enabled before you begin to configure the XMU+.

1. Press **Enter** to access the *Main Menu*.
2. Press the **Right Arrow** until you reach **System** on the Main Menu, and press **Enter**.
3. Press the **Right Arrow** until you reach **Partition** on the Main Menu, and press **Enter**.
4. Press **Enter** to select **Multi partition**.
   XMU+ displays a **YES** message if multi-partitioning is enabled, and a **NO** message if it is disabled.
5. Press **Exit** until the menu returns to the main display.
6. Record whether multi-partitioning is enabled (**YES**) or disabled (**NO**) on the Delivery Checklist. See *The XMU+ Delivery Checklist* on page 21.



Understanding XMU+ Remote Telephone Access

The Remote Access feature allows a programmer to access XMU+ from a remote location using a touch-tone telephone. When the programmer presses the touch-tone keys, the XMU+ receives a DTMF tone and responds with voice prompts that instruct the programmer on how to proceed.

When a user accesses the XMU+ remotely, the XMU+ responds immediately with a request for an access code. The manner in which the XMU+ responds from that point on depends on the access code entered, and whether the XMU+ is operating in Single Partition mode or Multiple Partition mode.

When XMU+ is operating in Single Partition mode:

Entering this access code...	Allows...	Specifications...
System	Administrators access to all levels of XMU+ features and options.	This number is unique from all other XMU+ access codes.
Message	Users access to specific messages in the XMU+. A message access code only allows changes to messages with that access code assigned to it. Each message in the XMU+ can be assigned an access code. If the user enters a message specific access code via remote access, then they do not have to enter the message number and # when using the record, play, or replace functions.	This code can be shared by one or more messages. Message access codes cannot be the same as the System access codes.

When XMU+ is operating in Multiple Partition mode:

Entering this access code...	Allows...	Specifications...
System	Administrators to have access to all levels of features and options in all XMU+ partitions.	This number is unique from all other XMU+ access codes.
Partition	Users access to a particular partition. When the user enters a partition access code, XMU+ selects that partition automatically. Once a partition access code is entered, the system does not accept or require message access codes to be used.	This number is unique to each partition. For example: Partition 1: 0101 Partition 2: 0202 etc.

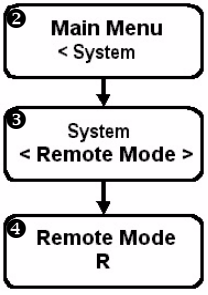
Setting Up XMU+ Remote Telephone Access (optional)

If Remote Access will be used to communicate with the XMU+, the unit must be:

1. Cabled to a telephone line. See *Connecting Remote Telephone Access (optional)* on page 51.
2. Set XMU+ to Remote Access mode using the XMU+ Front Panel. See *To set XMU+ Remote Telephone Access mode* on page 86.
3. Programmed with a Remote Access code using the XMU+ Front Panel. (optional). See *To change the default Remote Telephone Access code* on page 87.

To set XMU+ Remote Telephone Access mode

Remote access mode is set to Ring Start (R) by default, and is rarely changed.

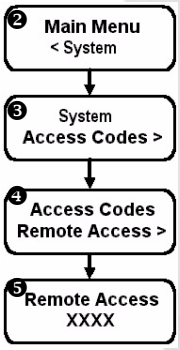


1. Press **Enter** to access the Main Menu.
2. Press the **Right Arrow** (three times) until you reach **System** on the Main Menu, and press **Enter**.
3. Press the **Right Arrow** until you reach **Remote Mode**, and press **Enter**.
4. Press the **Right Arrow** until you reach the desired remote mode, and press **Enter**. You can choose from the following options:
   - R - Ring start with loop/shunt disconnect (default).
   - RD - Ring start with DTMF disconnect.
   - RB - Ring start with busy tone disconnect.
   - RT - Ring start with dial tone disconnect.
   - RQ - Ring start with quick answer.
5. Press **Exit** until the menu returns to the main display.
6. Record the Remote Access mode on the Delivery Checklist. See *The XMU+ Delivery Checklist* on page 21.

To change the default Remote Telephone Access code

Assigning a new, unique access code to each XMU+ is recommended to prevent unauthorized telephone access to your system.

If multi-partitioning is enabled, a unique Remote Access code is required for each partition in addition to the System code. See *To check for system partitioning* on page 84 and the *XMU+ QuickStart Guide* for more information about multiple access codes.



1. Press **Enter** to access the Main Menu.
2. Press the **Right Arrow** (three times) until you reach **System** on the Main Menu, and press **Enter**.
3. Press **Enter, hit the right arrow key & Enter** to select **Access Codes**.
4. Press **Enter** to select **Remote Access**.
5. Press **Enter** to select the first digit in the existing access code.
6. Use the **Right Arrow** or **Left Arrow** to select a new Remote Access code digit, and press Enter.
7. Repeat Step 6 until the new access code is entered.
   Access codes must have a minimum of 4 and a maximum of 8 digits.
8. Press **Exit** until the menu returns to the main display.
9. Record the new Remote Access code on the Delivery Checklist.
   See *The XMU+ Delivery Checklist* on page 21.

Using Remote Telephone Access

There are many reasons to use Remote Telephone Access on the XMU+, including:

- Ease of use by users who are accustomed to making touch-tone keypad commands.
- Crisp, clear messages, since the background noise from other equipment in a COMS room is eliminated.
- Access to the XMU+ from any location.

Every remote access session starts with the user entering a Remote Access security code. See *Understanding XMU+ Remote Telephone Access* on page 85 for more information about Remote Telephone Access codes.

Once the code has been verified by XMU+, the various activities listed on the next page can be completed by entering the appropriate remote telephone access command. There are two ways to enter remote telephone access commands - Interactive and Direct.

With this Type of Command...	The user enters...	For example, to play a message...
Interactive	A single digit command, immediately followed by #. Pressing # indicates the end of a command to the XMU+. If required, the system then prompts the user to the next step or option, where they again enter the command and #.	Enter 8#. The XMU+ then prompts Enter Message Number. Enter the *nnn* # (where *nnn* is the message number). The XMU+ then prompts the user to the next step or option. The XMU+ will give the user 10 seconds to enter the message number.
Direct	A multi-level command, immediately followed by #. The direct entry method allows advanced users to enter commands quickly, without waiting for a prompt from the XMU+. Pressing # indicates the end of a command to the XMU+.	Enter 8 nnn #(where nnn is the message number.) The XMU+ then prompts the user to the next step or option.

Note: Once a digit is pressed, additional digits must be entered within 2 seconds, or the XMU+ will automatically terminate the entry.
Pressing # at any time during an entry will terminate the entry.

Remote Telephone Access Commands

To do this...	Use this Interactive Command...	Or this Direct Command...
Record Message	7#, then nnn#	7nnn#
Record Standby Message+	7#, then 0#	70#
Play Message	8#, then nnn#	8nnn#
Replace Message	9#, then nnn#	9nnn#
Delete Message	39# then nnn#	39nnn#
Delete Messages in a List Node	51# then nnn#	51nnn#
Change System Access code	1#, then 0# (administrators only)	10# (administrators only)
Change Partition Access code using System Access code*	1#, then nnn# (administrators only)	1nnn# (administrators only)
Change Partition Access code*	1#	1#
Change Message Access code**	1#, then nnn#	1nnn#
Obtain Line Counts	2#, then xy	2xy#
Switch Partition*	-	0nnn#
Obtain line counts for all lines on a card	2#, then x, then 0	2x0#
Clear all line counts	-	299#
Terminate Remote Access and Restart	-	00#
Disconnect	0#	0#
Change Remote Access Language	-	4z#
Change Partitions*	-	0nnn#
Turns message on	31#, then nnn#	31nnn#
Turn message off	30#, then nnn#	30nnn#
Override Enabled	-	591#
Override Disabled	-	590#

Note: nnn = partition, message, or access code number
x = card number, y = line number, z = language number
* = only available with partitioning enabled
** = only available with partitioning disabled
+ = Message number '0' is a temporary message (Standby Message), which can be recorded and played without affecting any other messages. When the user decides that the temporary message is recorded properly, they can replace any message in the XMU+ with the temporary message. When the user disconnects, the temporary message is automatically erased.

Working with Remote Telephone Access Messages

Users wanting to add, remove, or change a message remotely must have a good understanding of the configuration and messages in the XMU+. The user must also know the message number associated with each message they want to work with. This information is collected during configuration design and implementation. See the *XMU+ QuickStart Guide* for more information about messages.

To remotely access the XMU+

1. Dial the Remote Access telephone number. See *Physical Specifications* on page 21 for the appropriate telephone number.
   When the XMU+ answers the line, it responds Enter Access Code.
2. Enter the appropriate Remote Access code, followed by **#**. See *Physical Specifications* on page 21 for the appropriate access code.
   The access code entered determines the functions and options that the user is allowed access to. See *Understanding XMU+ Remote Telephone Access* on page 85.
   The XMU+ responds Enter Command.
3. Enter the command number (see *Remote Telephone Access Commands* on page 89), and follow the XMU+ responses until the desired command has been completed.

Note: If an invalid command or message number is selected, the XMU+ responds with the following message:
Error - Invalid Command or ***Error - No or Invalid Message***.

To disconnect from the XMU+

1. Complete the command.
2. Press **0**, followed by **#**.
   The XMU+ responds Done, and disconnects the line.

Note: If a remote command is not received within 30 seconds, the XMU+ automatically disconnects from the line.

To record a message remotely

1. Determine the number of the message you want to record.
2. Remotely access the XMU+. See *Working with Remote Telephone Access Messages* on page 90 for more information.
3. When the XMU+ responds Enter Command, press **7**.
4. Press the message number (nnn) you want to record, followed by **#**.
5. When the XMU+ responds with a short beep, record the message.
6. Press **#** to stop recording.
   The XMU+ responds with Message 'nnn' recorded.

To play a message remotely

1. Determine the number of the message you want to play.
2. Remotely access the XMU+.
   See *Working with Remote Telephone Access Messages* on page 90 for more information.
3. When the XMU+ responds Enter Command, press **8**.
4. Press the message number (nnn) you want to play, followed by **#**.
   XMU+ plays the message.
5. Press **#** to stop playing the message.

To delete a message remotely

TIP...

To cancel the delete command, hang up before you reach Step 3.

1. Determine the number of the message you want to delete.
2. Remotely access the XMU+.
   See *Working with Remote Telephone Access Messages* on page 90 for more information.
3. When the XMU+ responds Enter Command, press **39**.
4. Press the message number (nnn) you want to delete, followed by **#**.
5. The XMU+ will respond with a verbal confirmation 'done'.

To change default language of operation (optional)

When the XMU+ is accessed remotely, the first response it gives is always in English (Enter Access Code). The language it responds with from that point is also English, unless the language of operation is changed to French, Spanish, German, or Portuguese.

With single or multi-partitioned XMU+ units, each partition can be programmed to respond with a different language.

1. Remotely access the XMU+. See *Working with Remote Telephone Access Messages* on page 90 for more information.
2. When the XMU+ responds Enter Command, press **4**.
3. Press the number for the language you want to use, followed by **#**:
   - Press **1 #** for English (default).
   - Press **2 #** for French.
   - Press **3 #** for Spanish.
   - Press 4 # for German.
   - Press 5 # for Portuguese.

   The XMU+ will now use the selected language as its default language of operation for Remote Access.

Testing XMU+ Installation

8

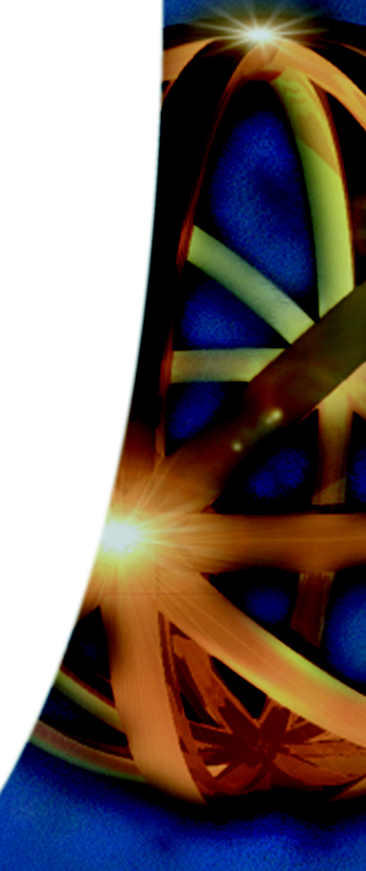
The final step in XMU+ installation is to ensure that the XMU+ is properly connected to the PBX.

There are two tests that must be completed to confirm that the XMU+ system has been installed correctly:

- Test system power and basic processor card operation. See *Testing Basic XMU+ System Health* on page 96.
- Test the telephone lines connected to the XMU+ to ensure that they are connected and active. See *Testing XMU+ Line Connections* on page 100.

In this chapter...

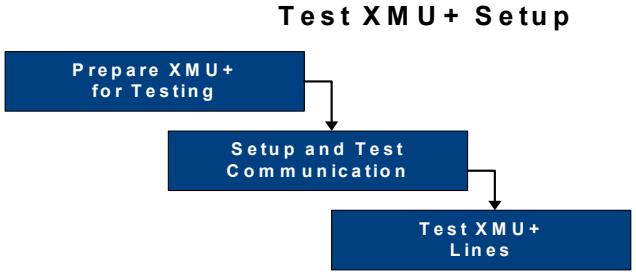
- *About XMU+ Testing* on page 95.
- *Testing Basic XMU+ System Health* on page 96.
- *Testing XMU+ Line Connections* on page 100.



interalia

About XMU+ Testing

Complete the following activities to prepare for and test XMU+ setup:



1. Test basic XMU+ system health. See *Testing Basic XMU+ System Health* on page 96 for more information.
2. Test XMU+ communication to ensure that the communication ports are working correctly.
3. Test XMU+ telephone lines to ensure that the XMU+ is properly connected to the PBX. See *Testing XMU+ Line Connections* on page 100 for more information.

Testing Basic XMU+ System Health

Complete the following basic XMU+ activities to test system power and basic processor operations.

1. Check system power. See *To check system power* on page 96.
2. Set the time and date. See *To set time and date (from the Front Panel)* on page 96.

Note: Although all tasks in this section can be completed using both the Front Panel and XMUCOM+, only the steps using the Front Panel are shown. See *Understanding the XMU+ Front Panel* on page 81 for more information.

To check system power

1. Plug the XMU+ into an approved power source (AC or DC, depending on the XMU+ system being tested).
2. Verify that the LCD is active (illuminates with black text on a green background).
3. If this XMU+ is a large chassis, verify that the LED indicators on the Power Supply card(s) are illuminated green.

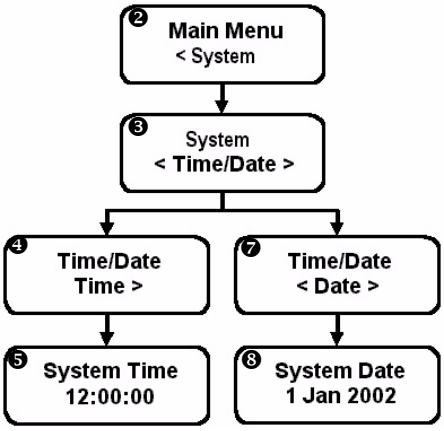
To set time and date (from the Front Panel)

1. Press **Enter** to access the Main Menu.
2. Press the **Right Arrow** until you reach **System** on the Main Menu and press **Enter**.
3. Press the **Right Arrow** button until you reach **Time/Date** on the **System** menu and press **Enter** to select **Time/Date**.
4. Press **Enter** to select **Time** on the **Time/Date** menu, then press **Enter** again to make the “hour” section of the display flash.
5. Change the hour using the **Right Arrow** and **Left Arrow buttons**, and then press **Enter**. The next section of the display will begin to flash.
6. Repeat Step 5 to change the minutes and seconds, and then press **Exit** to return to the **Time/Date** menu.
7. Press the **Right Arrow** button to reach **Date** on the **Time/Date** menu, and press **Enter**. Press **Enter** again to make the “day” section of the display flash.

8. Change the day using the **Right Arrow** and **Left Arrow buttons**, and then press **Enter.** The next section of the display will begin to flash.

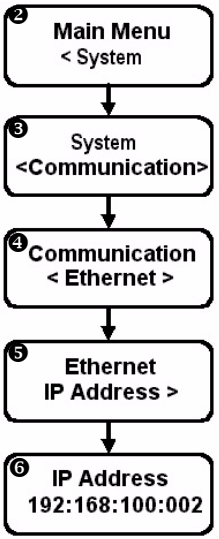
9. Repeat Step 8 to change the month and year, and then press **Exit** to return to the **Time/Date** menu.

10. Press **Exit** until the menu returns to the main display.



Assigning and Testing IP addresses

1. Press **Enter** on the XMU+ Front Panel to access the Main Menu.
2. Press the **Right Arrow** to reach **System** on the Main Menu, and press **Enter**.
3. Press Enter to access **Communications**.
4. Press **Enter** to select **Ethernet**.
5. Press **Enter** to select **IP Address**.
   The XMU+ displays the default IP address.
6. Press **Enter** to make the first three digits of the address flash.
7. Change the first three digits of the address using the **Right Arrow** (to increase the number) and **Left Arrow** (to decrease the number), and then press **Enter**. The next three digits of the address will begin to flash.
8. Repeat Step 7 until the appropriate IP address has been entered, and press **Enter**.
9. Press **Exit** until the menu returns to the main display.
10. If required, assign an IP Netmask and IP Gateway to the XMU+ by:
    - Repeating Steps 1 to 4, above.
    - At Step 5, pressing the **Right Arrow** to reach **IP Netmask** or **IP Gateway**, and then pressing **Enter**.
    - Continuing with Steps 6 to 9 to change the default IP Netmask or IP Gateway.



TIP...

To change only a select group of three digits:

- Press **Enter** until the appropriate group of three digits is flashing.
- Change the digits.
- Press **Exit** twice to return to the **Ethernet** menu.

Note: Normally, the default IP Netmask and IP Gateway are used for communication with XMU+. If these numbers are changed in the procedure above, ensure that the new numbers are recorded in *Communication Specifications* on page 25 of *The XMU+ Delivery Checklist* .

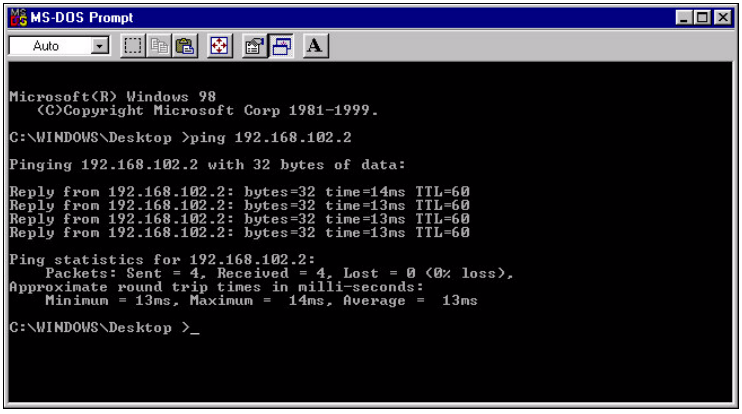
To ping the IP address

Ethernet communication with XMU+ can be verified by conducting a communication test from a PC with a LAN or direct Ethernet connection to the XMU+.

1. Choose **Start > Run** to display the *Run* window.
2. Type 'command' in the Open field and click **OK** to display a DOS window.

3. At the command line prompt, enter 'ping IP Address of the XMU+'.
'IP Address of the XMU+' is the IP address assigned to the XMU+ in *Assigning and Testing IP addresses* on page 98.

   A **successful** communication will show a result similar to the following:


MS-DOS Prompt
Auto
Microsoft(R) Windows 98
(C)Copyright Microsoft Corp 1981-1999.
C:\WINDOWS\Desktop >ping 192.168.102.2
Pinging 192.168.102.2 with 32 bytes of data:
Reply from 192.168.102.2: bytes=32 time=14ms TTL=60
Reply from 192.168.102.2: bytes=32 time=13ms TTL=60
Reply from 192.168.102.2: bytes=32 time=13ms TTL=60
Reply from 192.168.102.2: bytes=32 time=13ms TTL=60
Ping statistics for 192.168.102.2:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 13ms, Maximum = 14ms, Average = 13ms
C:\WINDOWS\Desktop >_

4. If the communication is unsuccessful, troubleshoot.

Testing XMU+ Line Connections

Each telephone line connected to the XMU+ should be tested to ensure proper connection to the PBX. To ensure that the lines are actually ringing, and that the XMU+ is answering correctly, you must:

- Ensure that a message has been recorded. See *To record a message* on page 83 (via Front Panel) or *To record a message remotely* on page 91(via Remote Access).
- Assign the message to a line. See *Testing XMU+ Line Connections* on page 100.
- Set the XMU+ mode of operation. See *To set line card operating modes* on page 102.
- Test the telephone line to ensure the message plays. See *To test lines* on page 103.

Note: Although all tasks in this section can be completed using Front Panel and XMUCOM+, only the steps using the Front Panel are shown. See *Understanding the XMU+ Front Panel* on page 81 for more information.

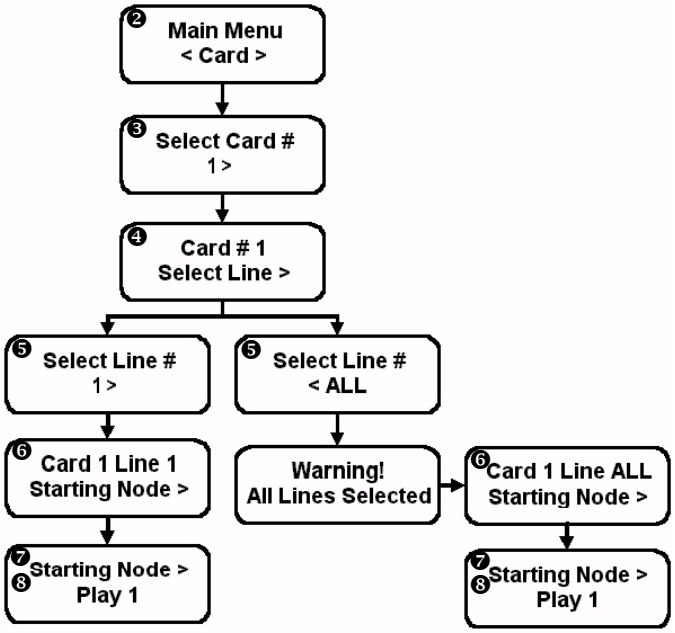
To assign messages to a line (from the Front Panel)

In order to configure the XMU+ to play messages, each message must first be configured to play on the appropriate line. The number of lines on the XMU+ is determined by the number of line cards installed. See *Line Card Checklist* on page 14 to determine the number of line cards installed.

When you assign a message to a line, it becomes that line's starting node. By default, the XMU+ assigns message 1 to line 1's starting node, message 2 to line 2's starting node, and so on.

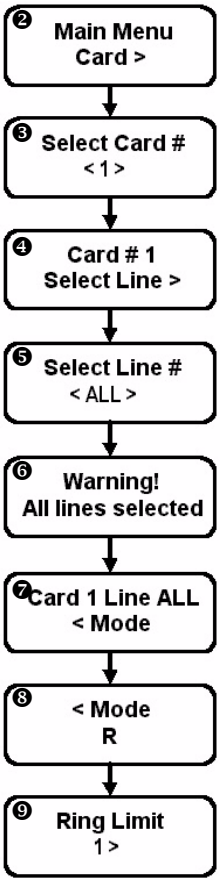
1. Press **Enter** to access the Main Menu.
2. Press the **Right Arrow** until you reach **Card** on the Main Menu, and press **Enter**.
3. Press the **Right Arrow** until you reach the appropriate **line card number,** and press **Enter**.
4. Press **Enter** to select **Select Line**.
5. Press the **Right Arrow** until you reach the line to which you want to assign a message, and press **Enter**. You can choose:
   - One of the 8 lines on the line card (individually). Press **Enter** again to accept.
   - All lines (1 to 8). When ALL is selected, a warning message appears. Press **Enter** again to accept.

6. Press **Right Arrow** to select the **Starting Node**.
7. Press **Enter** until the starting message number (for example: Play 1) begins to flash.
8. Press the **Right Arrow** until the starting message you want to apply to this line is flashing, and press **Enter**.
9. Press **Exit** until the menu returns to the main display.



To set line card operating modes

The mode of operation specified for the lines of each XMU+ line card controls the signaling to and from the PBX. Set the operating mode for each line card in your XMU+ unit.



1. Press **Enter** to access the Main Menu.
2. Press the **Right Arrow** to reach **Card** on the Main Menu, and press **Enter**.
3. Press the **Right Arrow** button until you reach the desired **card number** on the menu, and press **Enter**.
4. Press **Enter** to select **Select Line** on the menu.
5. Press the **Right** or **Left Arrow** buttons until you reach the **ALL** option on the menu, and press **Enter**. The display will now show Warning! All lines selected.
6. Press **Enter** to acknowledge your selection of all XMU+ lines on this line card.
7. Press the **Right Arrow** button until you reach the **Mode** option on the menu, and press **Enter**. Press **Enter** a second time to change the operating mode.
8. Press the **Right Arrow** button until you reach the desired operating mode, and press **Enter**. Listed here in the order they are displayed on the XMU+, you can choose from the following operating modes:
   - R - Ring Start with loop detect (default for passive, interactive, and Hybrid Analog line cards).
   - RN - Ring Start with no loop detect.
   - RQ - Ring Quick with loop detect.
   - RD - Ring with DTMF disconnect. (Use A, B, C or D to disconnect.)
   - RB (RB+) - Ring with busy disconnect.
   - RT (RT+) - Ring with Dial Tone disconnect.
   - LS/PR SP NO - Level Start/Pulse Return single play, CP relay normally open.
   - LS/PR SP NC - Level Start/Pulse Return single play, CP relay normally closed.
   - LS/PR MP NO - Level Start/Pulse Return multiple play, CP relay normally open.
   - LS/PR MP NC - Level Start/Pulse Return multiple play, CP relay normally closed.
   - LS/LR SP NO - Level Start/Level Return single play, CP relay normally open.

- LS/LR SP NC - Level Start/Level Return single play, CP relay normally closed.
- PS/LR NO - Pulse Start/Level Return, CP relay normally open.
- PS/LR NC - Pulse Start/Level Return, CP relay normally closed.
- PS/PR NO - Pulse Start/Pulse Return, CP relay normally open.
- PS/PR NC - Pulse Start/Pulse Return, CP relay normally closed.
- CP - Continuous Play, no relay toggle.
- CP NO - Continuous Play, CP relay normally open. (Default for low impedance line cards.)
- CP NC - Continuous Play, CP relay normally closed.
- SCP NO - Synchronized Continuous Play, CP relay normally open.
- SCP NC - Synchronized Continuous Play, CP relay normally closed.
- Off-line - Line will not operate.

9. If required (for operating modes **R**, **RN**, **RB**, **RB+, RT, RT+** and **RD**), press the **Right Arrow** button until you reach the desired ring limit, and press **Enter**. The ring limit is the number of cycles (rings) that the XMU+ will wait before answering the line (default is 1).
10. Press **Exit** until the menu returns to the main display.
11. If operating mode **R** is selected, perform a line check. See *To perform a line check* on page 124 for more information.
12. Record the line card operation modes in the Delivery Checklist. See *The XMU+ Delivery Checklist* on page 21.

To test lines

1. Collect all applicable telephone (line) numbers.
2. Record all telephone numbers in the Delivery Checklist. See *The XMU+ Delivery Checklist* on page 21.
3. Ring the appropriate line by dialing the telephone number. If the XMU+:
   - Answers and the message plays, the line cards are properly cabled.
   - Does not answer or the message does not play, troubleshoot. See *If XMU+ Is Not Answering* on page 121 for more information.
4. Repeat step 3 until all the lines have been tested.

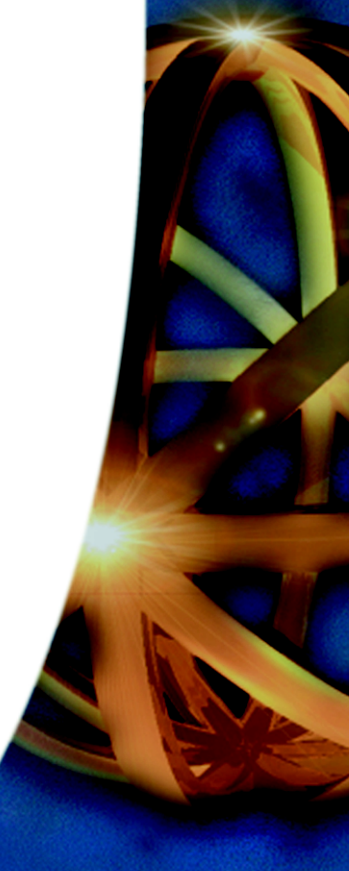
XMU+ Hardware Upgrades

9

From time-to-time, you may need to upgrade some of the hardware features of your XMU+, such as memory or line cards. This chapter outlines some of the more common tasks that you may need to perform.

In this chapter...

- *Standard XMU+ Tasks* on page 107.
- *Upgrading Line Cards* on page 109.
- *Replacing Control Cards* on page 112.
- *Replacing the XMU+ Large Chassis Power Supply* on page 114.
- *Upgrading Control Card Memory* on page 116.



interalia®

Standard XMU+ Tasks

The following standard procedures may be required on their own, or as a part of more complete upgrade procedures. They should be reviewed thoroughly.

ESD

Electrostatic Discharge

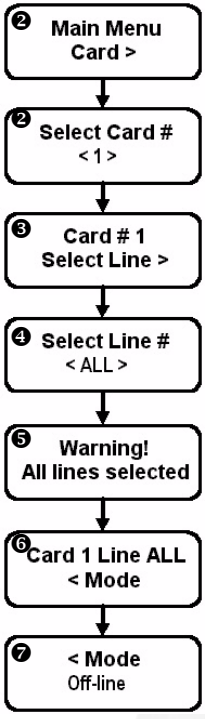
XMU+ maintenance and upgrades should only be completed by a qualified telecommunications / electronics technician. Standard static discharge precautions must be followed when handling any internal components. ESD precautions should also be observed.

Interalia® cannot be held responsible for damage to parts or equipment caused by improper handling or installation.

To take the XMU+ offline

Take the XMU+ offline before performing maintenance tasks to ensure that callers are not cut-off abruptly.

1. Press **Enter** to access the Main Menu.
2. Press the **Right Arrow** to reach **Card** on the Main Menu, and press **Enter**.
3. Press the **Right Arrow** button until you reach the **desired card number** on the menu, and press **Enter**. The display will now show Card # 1 Select Line.
4. Press **Enter** to select **Select Line**.
5. Press the **Right Arrow** button until you reach the **ALL** option on the menu, and press **Enter**. The display will now show Warning! All lines selected.
6. Press **Enter** to acknowledge the warning message.
7. Press the **Right Arrow** button until you reach the **Mode** option on the menu, and press **Enter** twice.
8. Press the **Right Arrow** button until you reach the **Offline** mode, and press **Enter**.
9. Press **Exit** until the menu returns to the main display.



To back up the current configuration

To reduce the amount of time required to restore the XMU+ in the event of a system failure, you should back up the configuration and messages contained within the XMU+ to a PC using XMUCOM+ before you begin any maintenance or upgrade procedure. See the *XMU+ QuickStart Guide* for more information.

If you cannot back up the XMU+ with XMUCOM+ software, make sure that you:

1. Obtain an up-to-date listing and description of the configuration.
2. Obtain the current text of all messages (so that they can be re-recorded later).
3. Understand Front Panel navigation and programming. See *Message Menu Hierarchy - Single Partition Mode* on page 77.

To power down the XMU+

1. Back up the configuration and messages contained within the XMU+. See *To back up the current configuration* on page 108.
2. Unplug the XMU+ from its power supply and all telephone lines.

To bring the XMU+ online

Depending on the task performed while the XMU+ is offline, the XMU+ may maintain its time and date, messages, and configurations - even if the system is down for days. However, after certain tasks are performed you may need to reload messages and configurations, and to reset the time and date.

1. Connect the XMU+ to the power supply and telephone lines.
2. If required, load all messages and configurations using:
   - XMUCOM+ software. See the *XMU+ QuickStart Guide* for more information.
   - Front Panel. See *Using the Front Panel* on page 82 and *Testing XMU+ Line Connections* on page 100.
3. Set time and date. See *To set time and date (from the Front Panel)* on page 96.

Upgrading Line Cards

Your XMU+ can be upgraded to provide new functionality. While standard static discharge precautions should be observed, it is not necessary to power down the XMU+ before working with line cards. See *Standard XMU+ Tasks* on page 107 for details.

In order to make the line card replacement fast and easy, you should have a medium flat-blade screwdriver and a small Philips screwdriver on hand.

To remove a line card

1. Take the XMU+ offline. See *To take the XMU+ offline* on page 107.
2. Locate the line card that you want to remove.
3. Remove the cabling from the back of the line card.
4. Loosen the two thumbscrews on either end of the line card's faceplate.
5. Pull the line card straight out.

To install a new line card

This procedure for installing (or reinstalling) XMU+ line cards applies only to the following types of line cards:

- Hybrid Analog.
- Low Impedance.
- MWR.
- Passive (found on older XMU units).
- Interactive (found on older XMU units).

See page 110 for instructions for installing (or reinstalling) T1 and MOH line cards.

1. Remove any line cards that conflict with the new line card to be installed. See *Understanding Line Card Population Rules* on page 30 and *To remove a line card* on page 109 for more information.
2. Locate the slot where the new line card will reside and ensure the faceplate does not have a warning sticker, as shown in *Understanding Line Card Population Rules* on page 30.
3. Remove the blank faceplate or existing line card. See *To remove a line card* on page 109 for more information.
4. Line up the line card's circuit board on the plastic rails in the chassis.
5. Slide the line card into place.
   When seating the line card, there should be slight resistance.
6. Tighten the thumbscrews on either end of the line card's faceplate.
7. Attach the appropriate cable. See *Cabling XMU+ Line Cards* on page 54.
8. Confirm that the XMU+ recognizes the new line card. See *To verify line card operation* on page 111.

Caution...

Forcing the line card into place could cause the pins on the connector to bend.

To install a new T1 line card

1. Determine whether the T1 line card will reside in slot 1 or slot 5, and locate that slot on the back of the large XMU+ unit.

   The small chassis can have a single T1 card.

2. If required, remove any line cards that conflict with the new T1 line card to be installed. See *Understanding Line Card Population Rules* on page 30 and *To remove a line card* on page 109 for more information.
3. Ensure that the appropriate settings have been applied to the T1 line card. See Chapter 3 of the *XMU+ Installation Handbook* for more information.
4. Line up the T1 line card's circuit board on the plastic rails in the chassis.

Caution...

Forcing the T1 line card into place could bend the pins on the connector.

5. Slide the T1 line card into place.
   When seating the card, there should be slight resistance.
6. Tighten the thumbscrews on either end of the T1 line card's faceplate.
7. Connect the RJ-45 connector to the port on the T1 line card. See *To cable T1 line cards* on page 54 for more information.
8. Confirm that the XMU+ recognizes the new line card. See *To verify line card operation* on page 111.

To install a new MOH card

1. Determine where the MOH line card will reside, and locate that slot on the back of the XMU+ unit.
2. If required, remove any line cards that conflict with the new MOH line card to be installed. See *Understanding Line Card Population Rules* on page 30 and *To remove a line card* on page 109 for more information.
3. Ensure that the appropriate settings have been applied to the MOH line card. See *Applying MOH Line Card Settings* on page 31 for more information.
4. Line up the MOH line card's circuit board on the plastic rails in the chassis.

Caution...

Forcing the MOH line card into place could bend the pins on the connector.

5. Slide the MOH line card into place.
   When seating the card, there should be slight resistance.
6. Tighten the thumbscrews on either end of the line card's faceplate.
7. Connect the RCA/Phono connectors to the appropriate port on the MOH line card. See *To cable MOH line cards* on page 55 for more information.
8. Confirm that the XMU+ recognizes the new line card. See *To verify line card operation* on page 111.

To verify line card operation

Confirm that the XMU+ recognizes the newly installed line card.

1. If required, bring the XMU+ back online. See *To bring the XMU+ online* on page 108.
2. Confirm that all required programming is in the XMU+ for the line card to function.
   If the programming is not available, download the messages and configurations you backed up in *To back up the current configuration* on page 108. See the *XMU+ QuickStart Guide* for more information.
3. Test the XMU+ lines. See *To test lines* on page 103.

Replacing Control Cards

Removal of the Control card may be required for some XMU+ upgrades. As well, older XMU units can be upgraded to obtain all XMU+ functionality (excluding the redundant power supply option) if a new Control card is installed. Control Cards should always be removed and/or installed by a trained technician.

To remove the Control card

1. Back up configuration and messages.
2. Take the XMU+ offline and power down. See *To take the XMU+ offline* on page 107 and *To power down the XMU+* on page 108.
3. Loosen the two thumbscrews on either end of the Control card's faceplate. See *Product Overview* on page 4 for a detailed diagram of the Control card.
4. Pull the Control card straight out.

To install a new XMU+ Control card

1. Take the XMU+ offline and power down. See *To take the XMU+ offline* on page 107 and *To power down the XMU+* on page 108.
2. Remove the old Control card. See *To remove the Control card* on page 112.
3. Line up the new Control card's circuit board on the plastic rails in the chassis.
4. Slide the new Control card into place.
   It may be necessary to align the handset and tape input in the front of the unit while seating the card. When seating the card, there should be slight resistance.
5. Tighten the thumbscrews.
6. Bring the XMU+ back online. See *To bring the XMU+ online* on page 108.
   Once the XMU+ is powered up, it will automatically run a test of the memory and display the available recording time.
7. Verify that the XMU+ displays the proper amount of recording time, as shown in the chart on the next page. The amount of memory available is determined by the memory modules installed on the Control card.

Caution...

Forcing the Control card into place could bend the pins on the connector.

Memory Module Part Number...	Number of Minutes...
48995	8
48996	16
48997	32

Memory Module Part Number...	Number of Minutes...
48998	60
48986	120
48980	360

Note: All modules can co-exist on a Control card.

Replacing the XMU+ Large Chassis Power Supply

Caution...

Power supply may contain lethal voltage.

Removal of the Power Supply card from the XMU+ (large chassis only) may be required:

- For some XMU+ repairs.
- To troubleshoot power supply failures.
- To change the power source (from AC to DC, or DC to AC).
- To add a secondary power supply (AC or DC).

Large chassis power supply cards should always be removed and/or installed by a trained technician. Small chassis Power Supply cards are not field upgradable, and must be returned to the factory for replacement.

Note: Since the AC power cord is the disconnect for the XMU+, ensure that the AC receptacle is near the unit. See *XMU+ Approvals* on page 143 for more information.

Bitte beachten Sie die wichtien Sicherheits informationen auf Seite 135, *XMU+ Technical Specifications and Approvals*.

To remove a single Power Supply card

1. Take the XMU+ offline and power down. See *To take the XMU+ offline* on page 107 and *To power down the XMU+* on page 108.
2. Loosen the two thumbscrews on either end of the Power Supply card's faceplate. See "Connecting the XMU+ to its Power Supply" in Chapter 2 of the *XMU+ Installation Handbook* for a detailed diagram of the Power Supply card.
3. Pull the Power Supply card straight out.

To install a new single Power Supply card

1. Take the XMU+ offline and power down.
   See *To take the XMU+ offline* on page 107 and *To power down the XMU+* on page 108.
2. Remove the old Power Supply card.
   See *To remove a single Power Supply card* on page 114.
3. Line up the circuit board of the new Power Supply card on the plastic rails in the chassis.
4. Slide the new Power Supply card into place.
   When seating the card, there should be slight resistance.
5. Tighten the thumbscrews.
6. Bring the XMU+ back online. See *To bring the XMU+ online* on page 108.
   If the power supply card is properly installed and working, the LED indicator will be green.

Caution...

Forcing the Power Supply card into place could bend the pins on the connector.

To remove a secondary Power Supply card

One of the benefits of having dual power supplies is that there is no need to take the XMU+ offline when one of the supplies needs to be removed.

1. Disconnect the power supply to be removed.
2. Loosen the two thumbscrews on either end of the Power Supply card's faceplate. See "Connecting the XMU+ to its Power Supply" in Chapter 2 of the *XMU+ Installation Handbook* for a detailed diagram of the Power Supply card.
3. Pull the Power Supply card straight out.

To install a secondary Power Supply card

One of the benefits of having dual power supplies is that there is no need to take the XMU+ offline when a second supply is being added.

1. If required, remove the blank faceplate or old Power Supply card. See *To remove a single Power Supply card* on page 114.
2. Line up the circuit board of the new Power Supply card on the plastic rails in the chassis.

Caution...

Forcing the Power Supply card into place could bend the pins on the connector.

3. Slide the new Power Supply card into place.
   When seating the card, there should be slight resistance.
4. Tighten the thumbscrews.
5. Connect the secondary Power Supply card to its power source.
   If the Power Supply card is properly installed and working, the LED indicator will be green when the XMU+ is powered up.

Upgrading Control Card Memory

A XMU+ memory module can be added if more memory is required (up to a maximum of 6 hours). Memory may also need to be replaced due to:

- Additional memory requirements for storing messages (up to a maximum of 6 hours).
- A defective memory module.

The Control card location reserved for a memory module is labelled as Memory Module 1.

Note: Due to the required factory startup after each memory upgrade or replacement, it is important to back up configurations and messages **before** working with XMU+ memory modules.

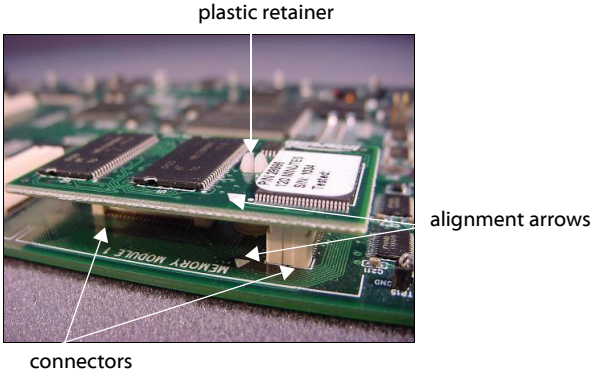
To replace an XMU+ memory module

A memory module may need to be replaced due to:

- Additional memory requirements (up to a maximum of 6 hours).
- A defective memory module.

1. Back up the configuration and messages contained within the XMU+.
   See *To back up the current configuration* on page 108.
2. Take the XMU+ offline and power down. See *To take the XMU+ offline* on page 107 and *To power down the XMU+* on page 108.
3. Remove the Control card. See *To remove the Control card* on page 112.
   The XMU+ will have one, two, or three memory modules installed in the sockets near the top edge of the Control card.
4. Gently pull up on the memory module to be removed. A slight rocking motion may be needed to disengage it.
5. Align the new module for mounting.
   Several measures exist to prevent improper installation, including:
   - White alignment arrows on both the Control card and memory module should point in the same direction.
   - The large central hole in the memory module should engage with the plastic retainer on the Control card.

6. Gently press the memory module down so that the connectors mate and the plastic retainer snaps through the hole on the Control card.



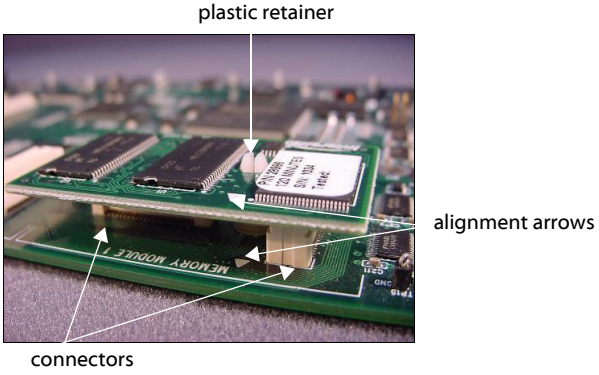
7. Replace the Control card. See *To install a new XMU+ Control card* on page 112.
8. Bring the XMU+ back online. See *To bring the XMU+ online* on page 108.
9. Perform Factory Reset 1 to reset the XMU+. See *To reset unit to default factory settings (including flash memory)* on page 132.
10. Restore the configuration and messages to the XMU+. See the *XMU+ QuickStart Guide* for more information.

To add an XMU+ memory module

1. Back up the configuration and messages contained within the XMU+. See *To back up the current configuration* on page 108.

   Take the XMU+ offline and power down. See *To take the XMU+ offline* on page 107 and *To power down the XMU+* on page 108.
2. Remove the Control card. See *To remove the Control card* on page 112. The XMU+ memory module is installed in a socket near the top edge of the Control card.
3. Align the new module for mounting.
   Several measures exist to prevent improper installation, including:
   - White alignment arrows on both the Control card and memory module should point in the same direction.
   - The large central hole in the memory module should engage with the plastic retainer on the Control card.

4. Gently press the memory module down so that the connectors mate and the plastic retainer snaps through the hole on the Control card.



5. Replace the Control card. See *To install a new XMU+ Control card* on page 112.
6. Bring the XMU+ back online. See *To bring the XMU+ online* on page 108. Once the XMU+ is powered up, it will automatically run a memory test and display the available recording time.
7. Perform Factory Reset 1 to reset the XMU+. See *To reset unit to default factory settings (including flash memory)* on page 132.
8. Restore the configuration and messages to the XMU+. See the *XMU+ QuickStart Guide* for more information.

10

Troubleshooting XMU+ Installation

Follow the troubleshooting steps in this chapter to resolve any difficulties that arise during your XMU+ installation. If the XMU+ is still not functioning properly when you complete these steps, contact ***Interalia***®.

In this chapter...

- *If XMU+ Is Not Answering* on page 121.
- *If Alarms Sound to Warn of XMU+ System Failures* on page 126.
- *If XMU+ Hardware Failures Occur* on page 127.

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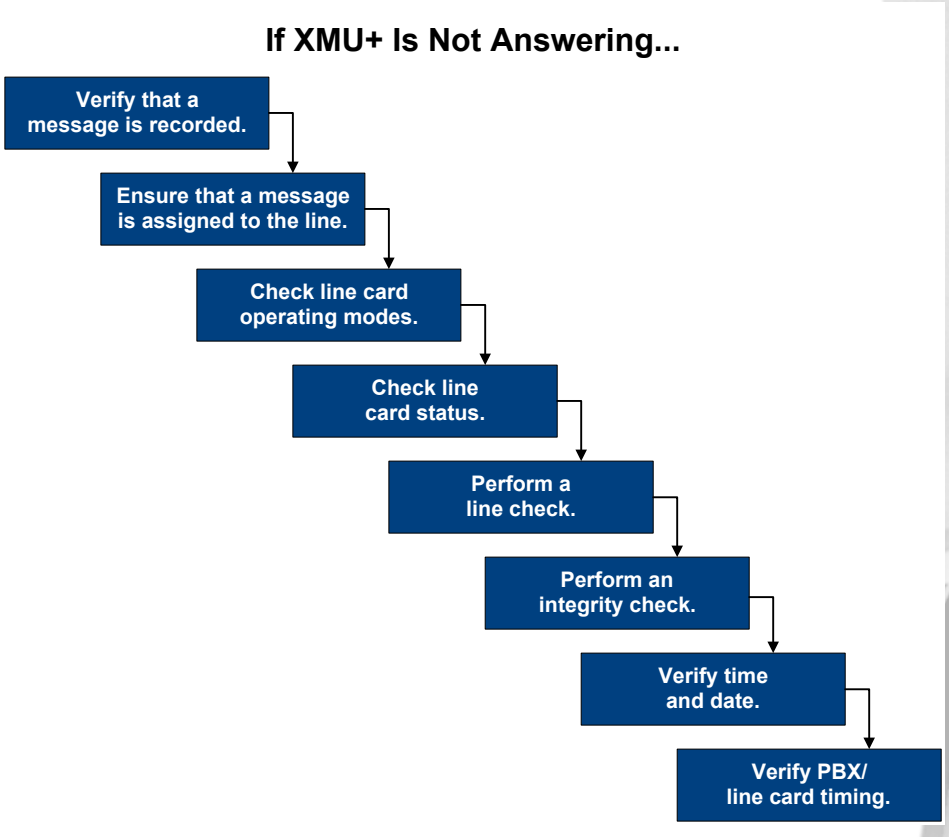
If XMU+ Is Not Answering

If the XMU+ does not answer a call, complete the troubleshooting tasks in the order shown until the problem is resolved.


If XMU+ Is Not Answering...
Verify that a message is recorded.
Ensure that a message is assigned to the line.
Check line card operating modes.
Check line card status.
Perform a line check.
Perform an integrity check.
Verify time and date.
Verify PBX/ line card timing.

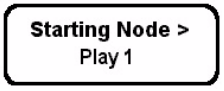
To verify that a message is recorded

1. Identify the message number that should have played when the XMU+ was called. Message information is collected during configuration design and implementation. See the *XMU+ QuickStart Guide* for more information about messages.
2. Play the message. See *To play a message* on page 83.
3. If the message plays, proceed to the next troubleshooting task - *To ensure the message is assigned to a line*.
4. If the message does not play, it has not been recorded.
   - Record a new message. See *To record a message* on page 83.
   - Assign the message to a line. See *Testing XMU+ Line Connections* on page 100.

To ensure the message is assigned to a line

Every message must be configured to play on the appropriate line. When you assign a message to a line, it becomes its starting node. By default, the XMU+ assigns message 1 to line 1's starting node, message 2 to line 2's starting node, and so on.

1. Identify the message number and line card that the message should be assigned to.
   Message information is collected during configuration design and implementation. See the *XMU+ QuickStart Guide* for more information about messages.
2. Follow **Steps 1 to 6** of *Testing XMU+ Line Connections* on page 100.
3. Ensure that the appropriate starting message is displayed (**Play 1**, for example, as shown to the right).

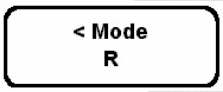


4. If the correct message number is displayed, proceed to the next troubleshooting task - *To check operating modes*.
5. If the correct message number is not displayed, assign the message to the line by completing **Steps 7 to 9** of *Testing XMU+ Line Connections* on page 100.

To check operating modes

The operating modes specified for each XMU+ line card control the signaling to and from the PBX. See *About XMU+ Operating Modes* for more information.

1. Identify the correct operating mode for each line card.
   See *The XMU+ Delivery Checklist* on page 21.
2. Follow **Steps 1 to 6** of *To set line card operating modes* on page 102.
3. Ensure that the appropriate operating mode is displayed for the first line card (**R**, for example, as shown to the right).

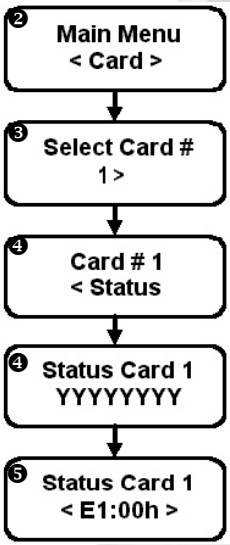


4. If the correct operating mode is not displayed, set the operating mode by completing **Steps 7 to 10** of *To set line card operating modes* on page 102.
5. Repeat Steps 2 and 3 for every line card.
6. If the correct operating mode is displayed on all line cards, proceed to the next troubleshooting task - *To check line status*.

To check line status

The Status Check feature checks the lines to ensure that a card is installed, and to show the status of each card (for example, idle, ringing, etc.).

1. Press **Enter** to access the Main Menu.
2. Press the **Right Arrow** to reach **Card** on the Main Menu, and press **Enter**.
3. Press the **Right Arrow** to select the appropriate **Card #**, and press **Enter**.
4. Press the **Right Arrow** to reach **Status**, and press **Enter**.
   The XMU+ will display one of the following status indicators:
   - -------- - no card is installed. See *To install a new line card* on page 109 to install the card.
   - EEEEEEEE - a configuration problem exists. See *To perform an integrity check* on page 125.
   - YYYYYYYY - card is ready. Proceed to Step 5.
   - NNNNNNNN - card is not ready (offline). Proceed to Step 6.



5. If a T1 line card is installed, press **Enter** again. The XMU+ displays a T1 interface status indicator. Proceed to the next troubleshooting task - *To perform a line check* on page 124.
6. If the card fails the status check, complete the following troubleshooting tasks.
   - Ensure a starting message is assigned. See *Testing XMU+ Line Connections* on page 100.
   - Ensure operating mode is set correctly. See *To set line card operating modes* on page 102.

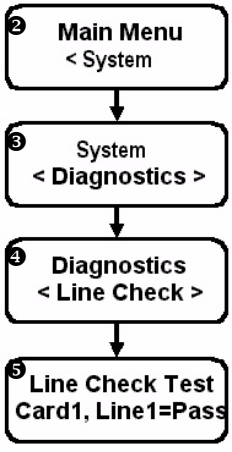
The following is a list of the line status indicators:

- '-' - line not installed
- 'N' - offline
- 'E' - configuration error exists
- 'Y' - line idle
- 'M' - call transfer queue MOH message
- 'C' - line connected
- 'R' - ringing on line
- 'H' - hold messages being played
- 'b' or 'B' - call transfer detecting a busy cadence
- 'A' call transfer detecting line has been answered
- 'r' or 'R' - call transfer detecting ring-back cadence
- '0 -9' , '#' , '*' - DTMF digits generated
- ' , ' - 1/2 second pause
- ' ! ' - hookflash
- 'd' or 'D' - call progress monitoring

To perform a line check

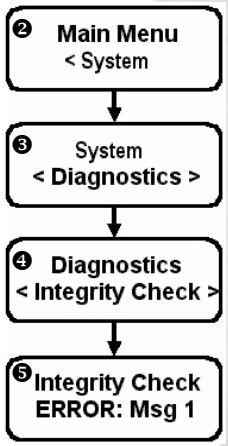
The Line Check feature checks the lines to ensure a telephone line is connected to the channel. It is only used for lines that are configured to **Ring Start** mode. See *To check operating modes* on page 123 to confirm that the line is in Ring Start mode.

1. Press **Enter** to access the Main Menu.
2. Press the **Right Arrow** to reach **System** on the Main Menu, and press **Enter**.
3. Press the **Right Arrow** to reach **Diagnostics**, and press **Enter**.
4. Press the **Right Arrow** to reach **Line Check**, and press **Enter**.
5. Press the **Right Arrow** to reach **the desired card and line to be tested,** and press **Enter**.
   Each line will display **Pass** or **Fail**.
6. Repeat Step 5 until all the desired cards and lines are checked:
   - If all line cards pass the line check, proceed to the next troubleshooting task - *To perform an integrity check*.
   - If any line cards fail the line check, ensure a starting node is assigned. See *Testing XMU+ Line Connections* on page 100.



To perform an integrity check

The Integrity Check feature checks the configuration to ensure that all messages used in a configuration are recorded.



1. Press **Enter** to access the Main Menu.
2. Press the **Right Arrow** to reach **System** on the Main Menu, and press **Enter**.
3. Press the **Right Arrow** to reach **Diagnostics**, and press **Enter**.
4. Press the **Right Arrow** to reach **Integrity Check**, and press **Enter**. The XMU+ runs the integrity check.
5. If no error message is displayed, proceed to the next troubleshooting task -*To verify time and date*.
6. If an error message is displayed:
   - Record it on paper, and press **Enter** to view the next error. Repeat this step until you have reviewed and recorded all errors.
   - Correct all errors appropriately.

To verify time and date

1. Review the time and date on the main display.
2. If the time and date are correct, proceed to the next troubleshooting task - *To verify timing between PBX and line cards*.
3. If the time and date are incorrect, reset them. See *To set time and date (from the Front Panel)* on page 96.

To verify timing between PBX and line cards

1. Ensure the PBX is configured correctly.
2. Identify the operating mode assigned to each line card. See *The XMU+ Delivery Checklist* on page 21.
3. Review the appropriate timing diagrams. See *About XMU+ Operating Modes* on page 68.
4. Ensure the PBX timing matches the timing on the diagrams.
5. If the timing is correct, proceed to the next troubleshooting task.
6. If the timing is incorrect, change the XMU+ operating mode. See *To set line card operating modes* on page 102.

If Alarms Sound to Warn of XMU+ System Failures

The XMU+ can be connected through the alarm contact pinout on the rear of the Control card to a light or a buzzer. If a power supply failure or microprocessor system failure occurs, a contact closure is generated on the alarm connector, which then triggers the external device (light or buzzer). See *Connecting Alarms (optional)* on page 52 for more information).

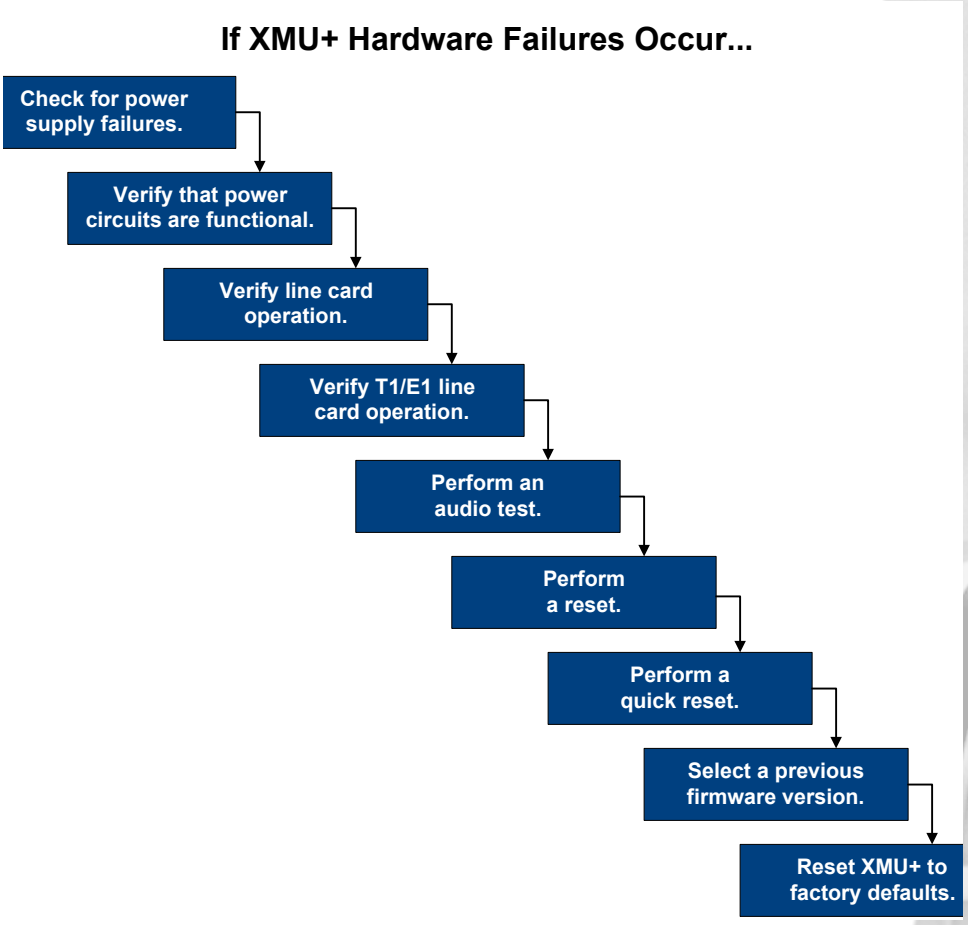
If this alarm sounds (or flashes), complete the troubleshooting tasks listed in *To respond to alarms from XMU+* to resolve the problem.

To respond to alarms from XMU+

1. Ensure that the alarm connector is properly wired. See *To wire the alarm connector* on page 53.
2. If the alarm connector is properly wired, proceed to the first troubleshooting task in *If XMU+ Hardware Failures Occur* on page 127 (*To check for XMU+ power supply failures - Small Chassis*).

If XMU+ Hardware Failures Occur

If the XMU+ does not come online, complete the following troubleshooting tasks in the order shown until the problem is resolved.


If XMU+ Hardware Failures Occur...
Check for power supply failures.
Verify that power circuits are functional.
Verify line card operation.
Verify T1/E1 line card operation.
Perform an audio test.
Perform a reset.
Perform a quick reset.
Select a previous firmware version.
Reset XMU+ to factory defaults.

To check for XMU+ power supply failures - Small Chassis

1. Ensure that the Front Panel display is active (lit-up).
   - If the Front Panel display is active, proceed to the next troubleshooting task - *To verify AC/DC power circuits are functional*.
   - If the Front Panel display is not active, remove the Power Supply card, and reinstall it to ensure proper seating. See *To remove a single Power Supply card* on page 114.
2. If the LED indicator is still not green, return the XMU+ to the factory to have the Power Supply card replaced with a new one.

To check for XMU+ power supply failures - Large Chassis

1. Ensure that the Front Panel display is active (lit-up).
   - If the Front Panel display is active, proceed to the next troubleshooting task - *To verify AC/DC power circuits are functional*.
   - If the Front Panel display is not active, proceed to Step 2.
2. Ensure that the Power Supply card LED indicator is green.
3. If the LED indicator is green, proceed to the next troubleshooting task - *To verify AC/DC power circuits are functional*.
4. If the LED indicator is not green, remove the Power Supply card, and reinstall it to ensure proper seating. See *Replacing the XMU+ Large Chassis Power Supply* on page 114.
5. If the LED indicator is still not green, replace the Power Supply card with a new one.
   See *Replacing the XMU+ Large Chassis Power Supply* on page 114.

To verify AC/DC power circuits are functional

1. Ensure that the appropriate power supply (AC or DC) is in operation.
2. If the appropriate power supply is not in operation, contact the appropriate repair/maintenance department at the power company.
3. If the appropriate power supply is in operation, ensure that the unit is properly plugged into its power supply. See “Connecting the XMU+ to its Power Supply” in Chapter 2 of the *XMU+ Installation Handbook*.
4. If the unit is properly plugged into its power supply, proceed to the next troubleshooting task - *To verify line card operation and wiring*.

To verify line card operation and wiring

Complete this troubleshooting step for each line card, excluding T1 line cards.

1. Check the status of each line card from the Front Panel. See *To check line status* on page 123.
2. If the line cards all appear ready after the status check has been completed, ensure that each line card is properly cabled to the PBX. See *Cabling XMU+ Line Cards* on page 54.
3. If all line cards are properly cabled to the PBX, proceed to the next troubleshooting task - *To perform an audio test* on page 130.

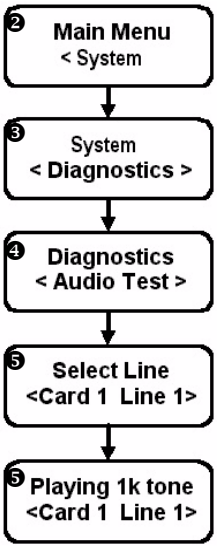
To verify T1 line card operation and cabling

1. Ensure that each T1 line card is properly cabled to the PBX. See *Cabling XMU+ Line Cards* on page 54.
2. If all line cards are properly cabled, ensure that the LED indicator on each T1 line card is flashing green.
3. If all LED indicators are flashing green, check the status of each T1 line card from the Front Panel. See *To check line status* on page 123.
4. If the T1 line cards all appear ready after the status check has been completed, perform an audio test. See *To perform an audio test* on page 130.
5. If the T1 line cards are all operating after the status check has been completed, ensure the T1 line cards are set correctly. See Chapter 3 of the *XMU+ Installation Handbook*.
6. If all line cards are set correctly, proceed to the next troubleshooting task - *To perform an audio test*.

To perform an audio test

Perform an audio test to check for line malfunctions.

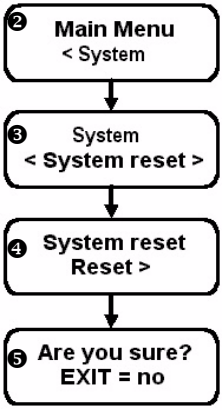
1. Press **Enter** to access the Main Menu.
2. Press the **Right Arrow** to reach **System** on the Main Menu, and press **Enter**.
3. Press the **Right Arrow** to reach **Diagnostics**, and press **Enter**.
4. Press the **Right Arrow** to reach **Audio Test**, and press **Enter**.
5. Press the **Right Arrow** to reach **the desired card and line to be tested,** and press **Enter**. The XMU+ goes through each line individually.
   - If a 1KHz tone sounds, the line is operating.
   - If no tone sounds, there is a line malfunction. Ensure that each line card is properly cabled to the PBX. See *Cabling XMU+ Line Cards* on page 54.
6. Press **Exit** until the menu returns to the main display.



To perform a reset

Performing a reset on the XMU+ when it has lost power or has frozen will **NOT** erase messages or configurations. The XMU+ shuts down slowly, as it waits until all lines have disconnected before shutting down and restarting. This could take minutes or hours.

1. Press **Enter** to access the Main Menu.
2. Press the **Right Arrow** to reach **System** on the Main Menu, and press **Enter**.
3. Press the **Right Arrow** to reach **System Reset**, and press **Enter**.
4. Press **Enter** to select **Reset** on the menu.
   XMU+ displays a message asking if you are sure that you want to perform this reset.
5. Press **Enter** to perform the reset.
   The XMU+ backs up statistics, waits until all lines have disconnected, and then restarts.



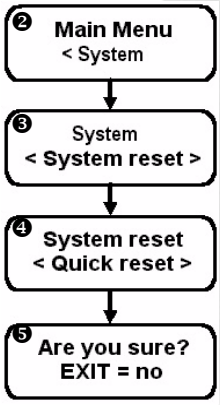
TIP...

To cancel the reset command and return to the previous menu, press **Exit** when XMU+ asks *Are you sure?*.

To perform a quick reset

Perform a quick reset of the XMU+ system when it must be reset immediately. Unlike a reset, a quick reset does not wait for all lines to disconnect before shutting down. Quick resets will **NOT** erase messages or configurations.

1. Press **Enter** to access the Main Menu.
2. Press the **Right Arrow** to reach **System** on the Main Menu, and press **Enter**.
3. Press the **Right Arrow** to reach **System Reset**, and press **Enter**.
4. Press the **Right Arrow** to reach **Quick Reset**, and press **Enter**. XMU+ displays a message asking if you are sure that you want to perform this reset.
5. Press **Enter** to perform the quick reset.
   The XMU+ shuts down immediately, and then restarts.



TIP...

To cancel the quick reset command and return to the previous menu, press **Exit** when XMU+ asks *Are you sure?*.

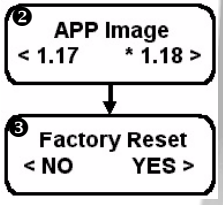
APP Image

Application Image

To select a previous firmware (APP Image) version

If a firmware upgrade fails during download, of if a firmware upgrade is defective, you may need to return the XMU+ to a previous firmware version. This could affect recorded messages and configurations.

1. Power down the XMU+.
   See *To power down the XMU+* on page 108.
2. Connect the XMU+ to its power supply while holding down the **Enter** key.
   XMU+ displays all previously installed firmware (APP) version numbers. A * is shown beside the current version number.
3. Press the appropriate **Arrow** (**Left** or **Right**) to reach the desired firmware (APP) version.
4. Press **Enter**. XMU+ resets the firmware to the selected version and displays a message asking if you want to perform a Factory Reset.
5. If you select:
   - **YES**, the XMU+ will reset to its default factory settings. This will erase **ALL** messages and **ALL** configurations, so you will have to download



configurations and messages. See the *XMU+ QuickStart Guide* for more information.

- **NO**, the XMU+ will return to the Time/Date display, leaving messages and configurations intact.

To reset unit to default factory settings (including flash memory)

CAUTION...

If you select YES, this procedure will erase **ALL** messages and delete **ALL** configurations.

Resetting the XMU+ to its original factory default settings should be performed only as a last resort, when the XMU+ is behaving erratically and has not responded to any other troubleshooting procedures.

The manner in which you perform a factory reset depends on whether or not the XMU+ front panel is still active. If the front panel is:

- Still active, perform Factory Reset 1.
- Completely unresponsive, perform Factory Reset 2.

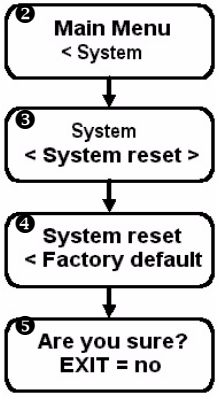
In either case, this procedure will erase ALL messages and delete ALL configurations, and return the XMU+ to its original factory settings.

Factory Reset 1

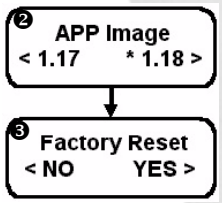
TIP...

To cancel the factory default command and return to the previous menu, press **Exit** when XMU+ asks *Are you sure?*.

1. Press **Enter** to access the Main Menu.
2. Press the **Right Arrow** to reach **System** on the Main Menu, and press **Enter**.
3. Press the **Right Arrow** to reach **System Reset**, and press **Enter**.
4. Press the **Right Arrow** to reach **Factory Default**, and press **Enter**. XMU+ displays a message asking if you are sure that you want to perform this reset.
5. Press Enter to perform the factory reset.
   The XMU+ shuts down immediately, and then restarts.



Factory Reset 2



1. Power down the XMU+. See *To power down the XMU+* on page 108.
2. Connect the XMU+ to its power supply while holding down the **Enter** key.
   XMU+ displays all previously installed firmware (APP) version numbers. A * is shown beside the current version number.
3. Press **Enter** to select the current firmware (APP) version number.
   XMU+ displays a message asking if you want to perform a Factory Reset.
4. Press the **Right Arrow** (**YES**) to reset the XMU+ to its default factory settings.
   The XMU+ erases **ALL** messages and **ALL** configurations.
5. Download configurations and messages.
   See the *XMU+ QuickStart Guide* for more information.

TIP...

If you do not select **YES** or **NO**, the XMU+ will time-out after five seconds and display the *Time/ Date*.

11

XMU+ Technical Specifications and Approvals

Technical Specifications are important attributes of XMU+ that have been detailed in this chapter for reference.

- System level specifications are those such as dimensions, weight, overall frequency response, and core characteristics.
- Card level specifications are those such as port impedances, output levels, and connector types.

The Approvals information in this chapter details the standards that XMU+ conforms with.

- Safety approvals: XMU+ compliance with safety standards.
- Telecom approvals: XMU+ compliance with telephone network standards.
- Emissions: XMU+ compliance with radiated and conducted emission (and immunity) standards.

Vorsicht:
Sicherheitshinweis: Der Netzstecker ist die An-/Ausschaltung für die XMU+. Vergewissern Sie sich deshalb, daß der Nestzanschluß in der Nähe der Maschine und leicht erreichbar ist. Weitere Informationen finden Sie auf Seite 17, Installation Handbook.

In this chapter...

- *Detailed XMU+ Technical Specifications* on page 137.
- *XMU+ Approvals* on page 143.

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Detailed XMU+ Technical Specifications

The following tables describe the technical features of the XMU+. These XMU+ features are approximate, and are subject to change without notice.

System Specifications

Technical Feature...	Details...
Physical	
Unit Dimensions:	◆ Large chassis: 177 x 444 x 330 mm (7.0 x 17.5 x 13.0 inches) ◆ Small chassis: 44 x 444 x 330 mm (1.75 x 17.5 x 13.0 inches)
Rack Space:	◆ Large chassis: 4 units ◆ Small chassis: 1 unit
Shipping Dimensions:	◆ Large chassis: 260 x 500 x 500 mm (10.25 x 19.7 x 19.7 inches) ◆ Small chassis: 107 x 540 x 455 mm (4.3 x 21.3 x 18.0 inches)
Unit Maximum Weight:	◆ Large chassis: 9.4 Kg (20.7 pounds) ◆ Small chassis: 3.1 Kg (6.9 pounds)
Shipping Maximum Weight:	◆ Large chassis: 12.9 Kg (28.4 pounds) ◆ Small chassis: 6.2 Kg (13.6 pounds)
Power and Thermal	
Power Consumption:	◆ Large Chassis: 220 Watts maximum ◆ Small Chassis: 50 Watts maximum
Heat Production:	◆ Large Chassis: 220 Watts (750 BTU/hr) maximum ◆ Small Chassis: 50 Watts (160 BTU/hr) maximum **Note:** BTU/hr = Consumption in Watts x 3.415
Environmental	
Temperature:	0 - 40 degrees °C (32 - 104°F) temperature range. Adequate cooling or heating must be provided to guarantee this range.
Dust:	Units not for operation in conductive dust atmospheres (i.e. coal dust, metal dust, etc.). Units not for operation in combustible dust atmospheres (i.e. saw dust, flour, etc.).
Humidity / Moisture:	Units not for operation outdoors or in conditions where condensation forms.
Atmosphere:	Units not for operation in explosive atmospheres (i.e. natural gas fumes, oil based paint fumes, etc.).

Card Specifications

Technical Feature...	Details...
Control Card	
Digital Audio Core Specifications:	
Encoding / Decoding:	8 bit PCM / 8 KHz sampling / μ-law (no data compression)
Frequency Response:	200 - 3400 Hz (+/- 3 dB)
Working Memory:	Up to 1.5Gbit on memory modules
Channel Capacity:	◆ Large chassis: 64 channels non-blocking plus 1 remote channel ◆ Small chassis: 24 channels using T1 line card or 8 channels using analog line card.
Core FPGA:	Xilinx Spartan II / 50K gate / proprietary logic
Processor Core Specifications:	
Processor type:	Motorola MPC855T / 66 MHz core / 33 MHz bus / 3.3V
Processor Memory:	◆ 32Mbit NOR FLASH / 64Mbit SDRAM / up to 1.5Gbit ◆ NAND FLASH on memory modules
Processor Firmware:	Proprietary, with a Licensed Real Time Operating System (RTOS)
Real Time Clock:	◆ Accuracy: 2 minutes / year ◆ Back-up power duration: 30 days
Port Specifications:	
Remote:	◆ Compatible with global PSTN (FCC / IC / CTR-21) ◆ Ring detection feature ◆ DTMF detection feature ◆ Loop current direction detection feature ◆ Connector: RJ 11 ◆ Impedance: 600Ω nominal ◆ Input Level (AGC onset): -30 dBm ◆ Nominal Output Level: -9 dBm ◆ Loop current: 10 mA - 60 mA (limiting) ◆ Off Hook Loop Voltage: 40VDC maximum

Technical Feature...	Details...
Modem:	◆ Compatible with global PSTN (FCC / IC / CTR-21) ◆ 56Kbps (V.90), 33.6Kbps (V.34), 14.4Kbps (V.32) + other modes ◆ V.42 LAPM and MNP 2-4 error correction ◆ V.42bis and MNP 5 data compression ◆ Connector: RJ 11
Alarm:	◆ Inputs: contact closure or applied DC voltage up to +/- 60V ◆ Outputs: dry relay contacts (1 form "C" - NO/NC/COM) ◆ Output contacts: 1.0 A @ 30V / 0.5A @ 60V (60V maximum) ◆ Input current: 5 mA @ 60V (maximum)
Serial Ports:	◆ Type: RS-232 Transmit and Receive data (software flow control required) ◆ Data Rate: 115 Kbps (maximum) ◆ Connector: RJ45 with proprietary pin-out ◆ Input Impedance (typ): 5 KΩ ◆ Input Voltage (low): -15 V to +1.2 V ◆ Input Voltage (high): +1.5 V to +15 V ◆ Output Voltage Swing (typ): +/- 5.4 V into 3 KΩ ◆ Protection (ESD): +/- 15KV Human Body +/- 15KV IEC1000-4-2 Air Discharge
Network:	◆ Type: 10/100BaseTX Ethernet IEEE 802.3 compliant (Auto Detect) ◆ Connector: RJ-45 connector with standard pin-out ◆ Impedance: 100Ω / matched for Category 5 UTP cable ◆ Protection: 1500 V RMS Hipot 2000 W / 100 A 8/20µs pulse
Tape:	◆ Connector: 1/4" "microphone" jack ◆ Impedance: 10 KΩ ◆ Input level (AGC onset): 120mV ◆ Nominal output level: 180 mV RMS (10 KΩ load)

Technical Feature...	Details...
Handset:	◆ Connector: RJ 22 ◆ Input Impedance: 3.2 KΩ ◆ Input level (AGC onset): 50 mV RMS ◆ Input Bias: 5 VDC through 3.2 KΩ ◆ Output Impedance: 6.8 KΩ ◆ Nominal output level: 20 mV (200 Ω load)
Power Supply Cards	
Input Voltage:	◆ Large AC: Auto ranging 100 - 240 V 50/60 Hz ◆ Large DC: 40 - 60 VDC ◆ Small AC: Auto ranging 90 - 264 V 50/60 Hz ◆ Small DC: 38 - 60 VDC **Note:** DC units are protected from accidental reverse polarity. See consumption data in *Power and Thermal* on page 137.
Output Voltages:	Output voltages of +5, +12, and -5 V are supplied to the XMU+ electronics.
Hot Swap Features:	◆ Status indicator (green if all output voltages nominal) ◆ Hot insertion / extraction management ◆ Soft start ◆ Status detection by control card

Technical Feature...	Details...
Line Cards	
Hybrid Analog (includes SH8 and MWR derivatives):	
Connector:	RJ21
Output Level:	-15 dBm / -9 dBm (high volume)
Output Impedance:	600 Ω nominal (FCC / IC / CTR-21 compatible)
Loop current:	10 mA - 60 mA (limiting)
Off Hook Loop Voltage:	40VDC maximum
Control Relay Current:	100 mA maximum (60 VDC maximum)
Start Input (Voltage Sense):	10 mA at 48 VDC (60 VDC maximum)
Start Input (Contact Closure):	5 mA (maximum)
Low Impedance Analog	
Connector:	RJ21
Output Level:	-15 dBm / -9 dBm (high volume)
Output Impedance:	25 ohms nominal (24 600 Ω ports in parallel)
Loop current:	10 mA - 60 mA (limited)
Off Hook Loop Voltage:	40VDC maximum
Control Relay Current:	1 A maximum (60 VDC maximum)
Start Input (Voltage Sense):	10 mA at 48 VDC (60 VDC maximum)
Start Input (Contact Closure):	5 mA (maximum)

Technical Feature...	Details...
Music on Hold (MOH) Card	
Connectors:	RCA “phono” jacks
Input Impedance:	10 KΩ nominal
Input level (AGC onset):	-30 dBm (note: POTS / CO compatible)
Output Impedance:	User configurable: 8 or 600 Ω
Output Level:	User configurable: -15, -9, +9 dBm (600 Ω) / 1 W (8 Ω)
See *Applying MOH Line Card Settings* on page 31 for an explanation of MOH user configurable impedance and level settings.	
T1 Digital Line Card	
Connector:	RJ45
Impedance:	100 ohm balanced
Line length:	0-1000 ft.
Signaling:	Loop start (ring with loop disconnect) E&M (immediate start, wink start)
Line Coding:	AMI, B8ZS
Framing Format:	SF/D4 (A & B bit) ESF (A, B, C, D bit)
See Chapter 3 of the *XMU+ Installation Handbook* for an explanation of T1 card user configurable attributes.	

XMU+ Approvals

The following approvals information details the North American and European Information Technology Equipment (ITE) standards with which the XMU+ conforms:

- Safety Approvals: XMU+ compliance with safety standards.
- Telecom Approvals: XMU+ compliance with telephone network standards.
- Emissions Approvals: XMU+ compliance with radiated and conducted emission (and immunity) standards.

Safety Approvals

TUV RHEINLAND TEST REPORTS E2172519/E2172521

CSA C22.2 No 60950 - 00	Safety: Information Technology Equipment (Canada)
UL 60950 - 3rd Edition	Safety: Information Technology Equipment (US)
IEC 60950 - 1	Safety: Information Technology Equipment (CE)

Telecom Approvals

TUV RHEINLAND TEST REPORTS CS03/121001/01, Part 68/121002/01, TBR21/121001/01

Industry Canada (IC) CS-03	Terminal Equipment Standard (Canada) *
47 CFR Part 68	Terminal Equipment Standard (US)
TBR 21 (with AN 14, 15, 16)	Terminal Equipment Standard (CE)

Emissions Approvals

TUV RHEINLAND TEST REPORTS P2172520.01/P217222.01

FCC Part 15	Radiated Emissions - Class A (North America)
FCC Part 15	Conducted Emissions - Class A (North America)
EN550221: 1998	Radiated Emissions - Class A (CE) **
EN550221: 1998	Conducted Emissions - Class A (CE) **
EN61000-3-2	Harmonics - Class A (CE)
EN61000-3-3	Flicker (CE)
EN61000-4	Immunity (CE)

* The abbreviation “IC” before the registration number signifies that registration was performed based on a Declaration of Conformity indicating that Industry Canada technical specifications were met. It does not imply that Industry Canada approved the equipment.

** This is a Class A product compatible with commercial/industrial environments. In a domestic environment, this product may cause radio interference that the user may be required to take adequate measures to control.

Glossary

Automatic Call Distribution (ACD)

The XMU+ can be configured for ACD applications, which automatically routes incoming calls to available personnel.

- In front-ending ACD queues, XMU+ answers all incoming calls, checks caller requirements, forwards, and queues the caller into the appropriate queue.
- In back-ending ACD queues, the client's telephone system answers the call and places the user in the queue. XMU+ controls the queue, plays appropriate holding messages, and forwards the caller to the requested person when the line becomes available.

See *About the XMU+ Announcement and Call Processing System* on page 3 for more information.

Auto-Attendant

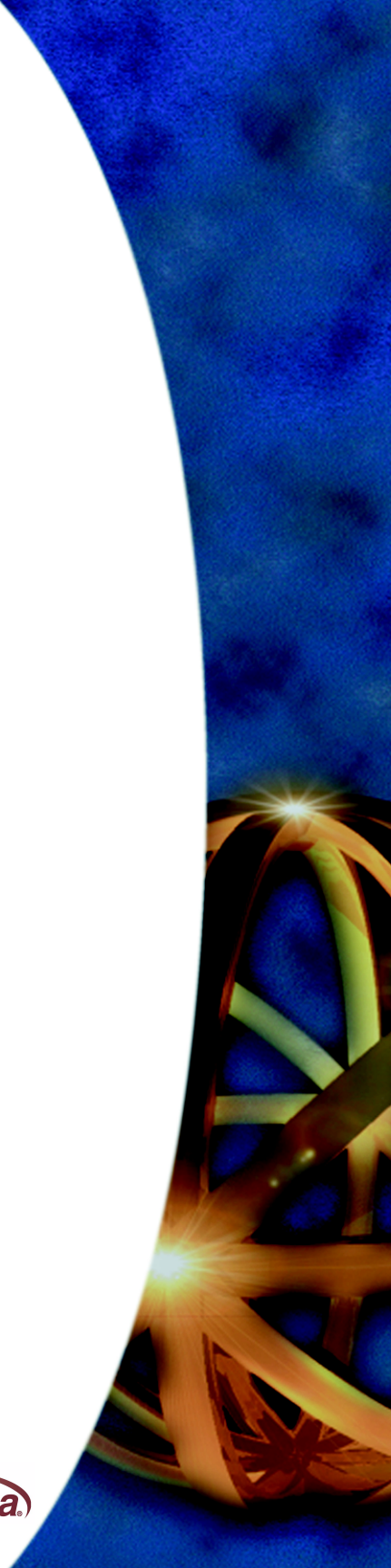
The XMU+ can be configured for Auto-Attendant applications, which provide:

- Personalized, automated greetings to incoming callers.
- A menu of choices.
- Call forwarding.

See *About the XMU+ Announcement and Call Processing System* on page 3.

Call Router

An XMU+ equipped with a Hybrid Analog line card can be configured to transfer callers to pre-programmed extensions or telephone numbers.



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Carrier Detect Indicator

The carrier detect indicator is associated with the modem port on the Control Card. This indicator should be lit during data transfer by modem. It indicates that the local modem has detected the remote modem's carrier, which is a basic attribute of the data transmission.

Channels

Channels are the virtual assignment of T1 lines within a cable into separate lines. Designating channels gives XMU+ the ability to use up to 24 lines on a T1 line card.

Chassis

The XMU+ large chassis provides flexible configuration options for users requiring 2 to 64 analog ports (48 T1 ports), while the XMU+ small chassis provides an effective solution for users requiring 2 - 8 analog ports (24 T1 ports).

See *Product Overview* on page 4.

Collision Indicator

The collision indicator is associated with the network (Ethernet) port on the Control card. This indicator is on when a data collision on the network is detected. Such collisions will normally occur in Ethernet, but if too many are indicated the network may have too much traffic and/or too many devices on it. Such a network problem could be solved by sub-dividing the network with a switching hub.

Configurations

XMU configurations are composed of commands, nodes, messages, and music that are executed when a call is received. Configurations are designed on XMUCOM+ software and then downloaded to the XMU+ unit.

See *About the XMU+ Announcement and Call Processing System* on page 3.

Control Pulse

A Control Pulse signal is provided to certain types of PBX equipment by the XMU+. This is used by those PBX types to detect the off hook condition (instead detecting loop current).

DS0

Digital Signal - Level Zero (0). In the digital communications hierarchy, this is the individual channel. The data rate is 64 Kbps (the rate required to digitize a voice message).

DS1

Digital Signal - Level One (1). In the digital communications hierarchy, individual channels are bundled into basic multi-channel groups called DS1. In North America, DS1 equates to T1 service (24 channels x 64 Kbps + 8 Kbps control = 1.544 Mbps). In Europe, DS1 equates to E1 service (30 channels x 64 Kbps + 128 Kbps control = 2.048 Mbps)

Dual Tone Multi Frequency (DTMF)

A telephone's touch tone system uses pairs of tones to represent the various keys. There is a "low tone" and a "high tone" associated with each button (0 through 9, * (star), and # (pound)).

The XMU+ uses a DTMF node to identify the unique tones pressed by a caller on a touch-tone telephone and route the call accordingly.

See *Typical Uses for XMU+* on page 7 for more information.

Ethernet

Ethernet is a popular Local Area Network (LAN) type originally introduced by Xerox and now supported by an IEEE standard. Ethernet uses a Carrier Sense Multiple Access / Collision Detect (CSMA/CD) technique to accommodate multiple devices on a common medium such as twisted pair cable. The XMU+ Control Card network port is an Ethernet port. It supports data transfer at 10 or 100 Mbps (less control "overhead").

Hot Swap

Cards with hot swap capability can be changed while the XMU+ system is operating. Line cards and power supply cards are hot swap types. For line cards, only those channels connected to the card to be removed and replaced are disrupted (or need to be taken out of service). Power supply cards can be swapped with no disruption to system operation so long as there is a second (redundant) power supply card.

Hybrid Analog

A hybrid analog line card incorporates both passive (ring detect, start signal detect, control pulse) and interactive (DTMF detect) announcement functionality.

Lines

Lines are the telephone lines (extensions) that can connect to the XMU+.

Link Indicator

The link indicator is associated with the network (Ethernet) port on the Control Card. This indicator is on when the port is connected to an active Ethernet network.

Loop Current

For PSTN lines and certain PBX equipment types, the current that flows in the audio pair when the terminal equipment (XMU+ line card port) is off hook is detected and used for control purposes.

Low Impedance

The Low Impedance card is a variant of the hybrid analog line card specially equipped to drive audio and signaling to 24 RAN (Recorded Announcement) ports in parallel on Nortel Meridian PBX equipment.

Memory Module

Memory Modules reside on the Control Card, and provide working and non-volatile memory storage for messages and configurations within the XMU+. Memory Modules are replaceable and upgradeable.

See *Upgrading Control Card Memory* on page 116.

Mini Weather Radio (MWR)

The MWR line card is used for Environment Canada weather broadcasting applications.

See *Line Cards Supported by XMU+* on page 5.

Modem

A device for transferring digital data over analog telephone lines. Modem is the

contraction of the words MODulator DEModulator.

Music on Hold (MOH)

An XMU+ equipped with a Music On Hold (MOH) line card can be set up to combine music and messages to create an On Hold environment for your callers.

See *Applying MOH Line Card Settings* on page 31.

Node

XMU building blocks consisting of a group of commands or XMU settings that are used to build XMU+ configurations.

See *About the XMU+ Announcement and Call Processing System* on page 3.

Partition

The XMU+ can be configured for single or multi-partition mode. When multi-partitioning is configured, each partition acts as an individual XMU+ unit.

See *Meeting System Requirements* on page 16.

Passive announcements

Passive announcements are those configured to simply playout with a ring or control pulse start then disconnect. DTMF detection is not used during a passive announcement.

Port

A female connector on the XMU+ for connecting the (male) connector of various external devices.

Private Branch Exchange (PBX)

This is typically a private telephone network used within an enterprise. Users of the PBX share a certain number of outside lines for making telephone calls external to the PBX.

Public Switched Telephone Network (PSTN)

The public telephone system that operates the normal phone system.

Start Signal

Certain types of PBX equipment provide a start signal to the XMU+. This is used instead of a conventional ring signal superimposed on the audio pair.

T1

T1 is a North American high-speed, dedicated “DS1” connection that is capable of transferring digital signals at 1.554 Mbps (mega-bits per second). The payload of a T1 connection is twenty-four (24) 64 Kbps “DS0” voice channels.

Uniform Call Distribution (UCD)

The XMU+ can be configured for UCD applications, which distributes all incoming calls uniformly among a group of people.

See *About the XMU+ Announcement and Call Processing System* on page 3.

Uninterruptible Power Supply (UPS)

The XMU+ can be connected to a UPS, which will maintain the XMU+ for a limited time in case of a power failure.

See *Power Requirements* on page 17.

XMU+

The XMU+ Digital Call Processor is a microprocessor based, voice announcement and call processing system.

XMUCOM+

The XMUCOM+ software is a windows based program that lets you configure, download, update, and backup configurations and messages to the XMU+.
Configurations designed with XMUCOM+ are transmitted to the XMU+ unit through a modem connection or through LAN based networks.

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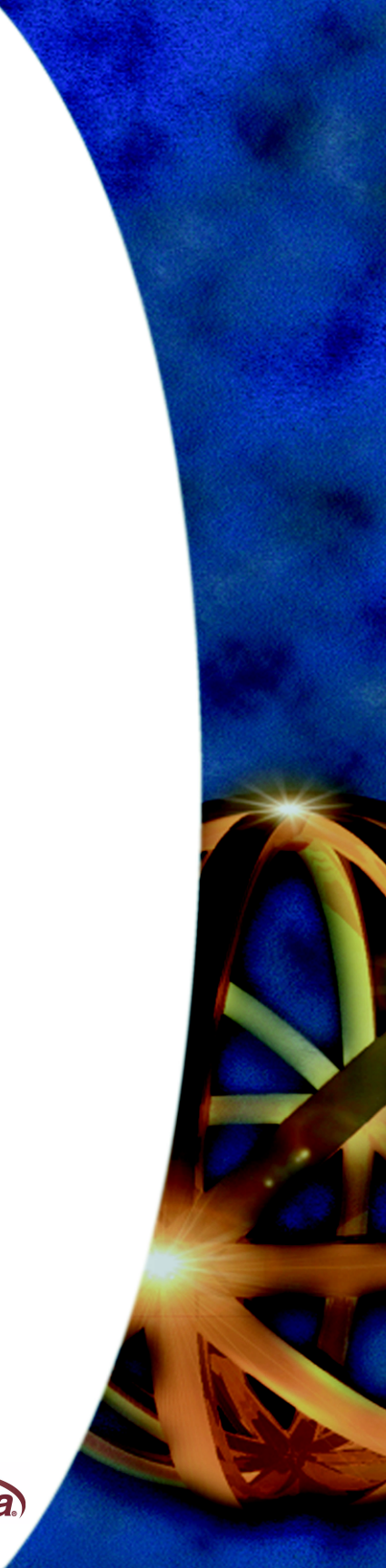

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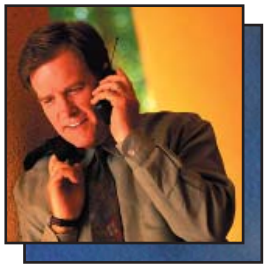

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